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Mindful of the Years That Have Been Entered on the Scroll of Time Let Us Determine to Profit by the Lessons and Improve the Opportunities for Pharmacy to Serve.

Vol. XXVII, No. 1 JANUARY, 1938

JOURNAL
OF THE
AMERICAN PHARMACEUTICAL ASSOCIATION

TRADE MARK

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THE 86th ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN MINNEAPOLIS, MINN., Hotel Nicollet, August 22–27, 1938.

The 1938 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conference of Pharmaceutical Association Secretaries, of the Pharmaceutical Law Enforcement Officials and the Plant Science Seminar will also be held in Minneapolis, Minn.

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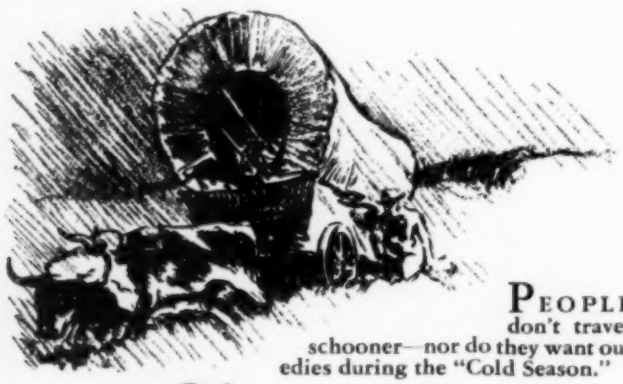

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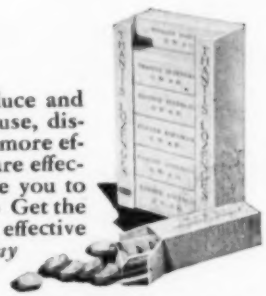

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PRIMARY REQUIREMENTS OF A PHARMACEUTICAL PLAN.*

Although the Bureau of Industry has not yet finalized the plan for the reorganization of pharmacy in New Zealand, it has indicated what in its opinion are the basic requirements of a satisfactory plan.

These, briefly, are stated by the Bureau to be as follows:

"(1) The paramount object is to safeguard the public interest. To that end, it is necessary that prescriptions be compounded with drugs of standard quality and be dispensed by qualified pharmacists.

(2) Consistent with the foregoing, the price should be as low as possible, after providing for a proper return for all services rendered by efficiently organized businesses.

(3) The efficiency of a pharmacy cannot be considered on the basis of dispensing alone, but also on the basis of personal service within proper limits (including the sale of general medical and surgical goods) that can be provided.

Here in a few words is the framework of a satisfactory pharmaceutical reorganization plan. The first essential is the protection of the public, the quality of the drugs used and the personnel of the service being primary in their importance.

Efficiency is aimed at in the second point, the cost of the dispensing service rated on a standard fixed by the enterprising man of business rather than those less alert.

From this point, the Bureau correctly assumes that pharmacy cannot live on dispensing alone, and that merchandising within proper limits must be practiced if the cost of dispensing is to be kept within reasonable limits.

It is from this basis that pharmacy must view the future. Probably when the complete plan is released, it will be seen that the Bureau is working on the assumption that the industry is prepared to exert itself so that the benefits of reorganization may be enjoyed by all. Those who fail to take advantage of the opportunity are bound to experience repercussions inevitable under the circumstances, but the underlying motive behind the whole plan is not one savoring of compulsion. It is the voluntary action of pharmacists in effecting their own system of reorganization that may be the salvation of the business. The opportunity is a golden one in many respects, especially when the alternative is considered.

The three fundamental points of the plan, therefore, considered as part of a further plan, may be accepted by pharmacists as guiding principles to be followed in putting the plan into action."

* Liberty is taken in quoting from *The Australasian Journal of Pharmacy*, 11, 10 (1937).

THE CODE OF ETHICS FOR PHARMACY.

Past-President of the British Pharmaceutical Society, E. S. Peck, gave an address on "The Code of Ethics for Pharmacy; Its Desirability and Practicability." Mr. Peck stated in his address that it might be said that "the idea of any Code of Ethics is American and we know that endeavors have been made in the United States to put into practice Codes of Ethics in many different businesses and we also know that we, in this country, Great Britain, prefer to do the straight thing rather than set down on paper something we intend to do. My feeling is that the Code of Ethics would be useful as an ideal to be aimed at rather than possibly be capable of 100% achievement."—*The Pharmaceutical Journal.*

Mr. Peck outlined the duties and conduct under the Code of Ethics for Pharmacy.

The JOURNAL OF THE A. PH. A. prepared a Code of Ethics which has been published for wide distribution and also a more attractive form that can be displayed in schools of pharmacy and pharmacies. A display of the Code of Ethics in every pharmacy is desirable and for that reason these two forms of the Code may be obtained from the JOURNAL.

Another effort which should be supported for display is the Oath and Prayer of Maimonides. While this is not strictly related to pharmacy it conforms to the early practice which brought the service of the physician and of the pharmacist into close relation and every effort which will encourage higher professional practice is deserving of encouragement.

GLENN L. JENKINS.

UNIV. OF MICH.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XXVII JANUARY, 1938 No. 1

GLENN L. JENKINS.

Glenn Llewellyn Jenkins, second vice-president of the AMERICAN PHARMACEUTICAL ASSOCIATION, was born on a farm near Sparta, Wisconsin, March 25, 1898. After concluding his preliminary education, he served an apprenticeship in the Menges Pharmacy in Madison and entered the University of Wisconsin where, in 1922, he earned the degree of B.S. in Pharmacy. During vacation periods he worked as station manager for the H. J. Heinz Company. Returning to the University of Wisconsin as Hollister Fellow, he received the M.S. degree in 1923; appointed assistant instructor in the same institution, he continued his graduate studies and received the Ph.D. degree in 1926. The following year he was appointed instructor in pharmacy, a position which he held until appointed professor and head of the department of pharmaceutical chemistry at the University of Maryland, School of Pharmacy, in 1927. He resigned from the faculty of the University of Maryland in 1936 to accept the position which he now holds as professor and head of the department of pharmaceutical chemistry at the University of Minnesota, College of Pharmacy.

Dr. Jenkins served as chairman of the Section on Education and Legislation (1929–1930), chairman of the Scientific Section (1936–1937) and as a member of a number of other committees of the AMERICAN PHARMACEUTICAL ASSOCIATION. He is a member of the Revision Committee and chairman of the Sub-committee on Chemicals of the N. P. VI, and an auxiliary member of the sub-committees on chemistry of the U. S. P. XI revision committee. He was chairman of the sub-committee on chemistry of the Pharmaceutical Syllabus committee. He has been chairman of the Conference of Chemistry Teachers of the American Association of Colleges of Pharmacy. He is a member of the executive committee of the Subsection on Pharmacy of the American Association for the Advancement of Science.

The Ebert Prize was awarded to Dr. Jenkins in 1936. The paper specifically mentioned for this honor, "The Assay of Hypophosphites Official in the National Formulary," was published in the January JOURNAL for 1936, pages 19 to 27.

Dr. Jenkins is co-author of the textbook "Quantitative Pharmaceutical Chemistry." His numerous researches on analytical, phytochemical and chemotherapeutic subjects have been published in the scientific journals.

He is a member of Rho Chi, honorary pharmaceutical society, and was its national president (1930–1934). He is a member of Sigma Xi, Gamma Alpha, Theta Chi, Kappa Psi and numerous other fraternal and scientific societies.

Dr. Jenkins married Serena E. Forberg of Winnetka, Illinois, June 29, 1926. Three children, Serena Elizabeth, Thomas Nelson and Glenn Llewellyn, Jr., enliven their home.

INTERIM REVISION ANNOUNCEMENT NO. 1.

A Revision of Tests under Aqua Aurantii Florum, Benzoinum, and Oleum Amygdalæ Expressum of the Pharmacopœia of the United States.

ELEVENTH DECENNIAL REVISION.

The following revision of the U. S. P. XI tests is hereby announced through the authority of the Committee of Revision and the action of the Board of Trustees and will become official one month from the date of this release.[1]

AQUA AURANTII FLORUM, Page 64.

Change the test for residue on evaporation to: "Evaporate 100 cc. of the Orange Flower Water on a water-bath, and dry the residue to constant weight at 100° C.: not more than 0.005 Gm. of residue remains."

BENZOINUM, Page 86.

Omit the test for "rosin," lines 13 and 14 from the bottom of the page.

OLEUM AMYGDALÆ EXPRESSUM, Page 248.

Omit the test for the solidification point of the fatty acids, lines 9 and 10 from the bottom of the page.

The urgency of the revision of these three tests, due to their involving the importation of these official items, necessitates an "interim revision announcement." It is expected that from time to time other revisions in official texts will be similarly announced, to meet conditions which demand prompt action.

When enough of these "interim revision announcements" have accumulated and other added or revised monographs have been adopted it is expected that all of these new and revised texts, approved since the appearance of the First U. S. P. XI Supplement, will be reprinted in full and issued as the "Second U. S. P. XI Supplement." "Interim Revisions" are being announced through the medical and pharmaceutical press.

E. Fullerton Cook.
Chairman of the Committee of Revision of the
U. S. Pharmacopœia.

December 18, 1937.

[1] The informal announcement of the omission of the "rosin" test under Benzoin was made public about two months ago.

EDITORIAL

E. G. EBERLE, EDITOR 2215 Constitution Ave., WASHINGTON, D. C.

The Editor is appreciative of the kindness and sympathy expressed by members and friends during his stay at the hospital because of recent illness and following a surgical operation. These evidences of friendship greatly lightened the affliction.

It was also necessary to call on the secretary and other co-workers, which meant the time of added service on their part in getting out the JOURNAL.

To all of them the editor extends thanks, but his words are feeble compared with the encouragement given. He, therefore, can only hope that the acknowledgment will speak in a small way for the feeling of his response.

PROBLEMS OF THE PHARMACOPŒIA.

AT THE Dallas meeting of the ASSOCIATION, Chairman E. Fullerton Cook, of the U. S. P. Committee of Revision, in making the customary annual report, A. PH. A. JOUR., page 900 (Oct. 1936), submitted several suggestions to perfect the organization and work of the U. S. P. Convention and the Committee of Revision, and expressed the hope that those interested in the Pharmacopœia would have an opportunity to consider and express themselves before the 1940 Convention, about these plans for improving its professional status.

The Pharmacopœia, as a professional and legal standard, must keep pace with scientific progress, and in order to do so, fundamental changes in procedure and in personnel are increasingly necessary. Interim revision by supplements and other changes in procedure were approved at the 1930 Convention and suggestions for further improvement will be submitted later. Chairman Cook's present suggestions were directed toward improvements in the selection of the personnel which will carry on the work of Pharmacopœial revision because success depends in great measure upon the ability and reliability of those selected.

The Committee on U. S. Pharmacopœia of the AMERICAN PHARMACEUTICAL ASSOCIATION desires, in addition to its other activities, to coöperate by gathering opinions of Chairman Cook's suggestions from A. PH. A. members and others directly interested. The Committee has partly rearranged the suggestions and presents below a brief discussion of the six problems submitted, each of which merits a definite expression of opinion.

May we ask that you aid the committee by studying each problem carefully, expressing your approval or disapproval on the enclosed reply-card, and mailing it promptly? If you desire to present your opinions at greater length, please do so and send your letter to the address on the reply-card. The Committee plans to present a summary of the replies received as soon as sufficient returns are in and to submit other problems during 1938 and 1939, with the object of obtaining the pharmaceutical viewpoint with respect to Pharmacopœial revision for presentation in 1940 or earlier. Should you have other questions upon which you think the ASSOCIATION should express itself, these, too, will be gratefully received by the Committee. (See pages XV and XVI for reply-card which can be cut out and mailed.)

Discussion of Policies and Questionnaire.

1. DELEGATES TO THE CONVENTION.

The appointment of delegates to the Pharmacopœial Convention is a matter of specific interest to the College or Association making the appointment. Considerable criticism has been voiced in the past to the effect that certain Colleges and Associations have appointed delegates having no direct affiliations with the appointing institutions, or have presented other groups with credentials signed in blank. Whatever may have been the effect of such appointments is not definitely known, but it certainly seems desirable that every delegate who is accepted for membership in the Decennial Convention should be able to show that he or she is qualified to speak for the College or Association which is represented.

(1) Do you favor that the Committee on Credentials include in its instructions to the Colleges and Associations a statement to the effect "that no delegate be considered eligible to a seat in the Convention who has not been definitely chosen by the group or college he or she is appointed to represent?"

2. VOTING IN THE CONVENTION.

Chapter VIII of the By-Laws of the Pharmacopœial Convention permits each accredited delegate one vote on every question before the Convention. Associations or Colleges in nearby territory are able to send a delegation of three each at little cost and are thus able to outvote organizations from distant points who find it difficult to secure full delegation because of great sacrifice of time and the heavy cost of transportation. It would seem desirable, at least in a spirit of fairness, that each delegation should confer and then cast but one vote.

(2) Do you favor the recommendation that Chapter VIII of the By-Laws of the Pharmacopœial Convention be changed to allow each member-organization one vote on every question regardless of the attendance of one, two or three delegates?

3. THE TIME FOR THE A. PH. A. CONVENTION IN THE DECENNIAL YEAR.

For many years it has been the custom of the American Pharmaceutical Association to hold its annual convention, during the U. S. P. convention year, in Washington or in a nearby city. The time selected has been the week preceding that in which the Pharmacopœial Convention is held. The object of such action is to save both time and expense of delegates who would thus make but one trip instead of two during the year. This object seems worthy enough and there is no reason for its discontinuance. There has, however, been a certain amount of unsavory criticism to the effect that the A. Ph. A. meeting has been the scene of the organization of politically inspired cartels whose action might effect the high standard of scientific and professional procedure which should dominate the U. S. P. Convention. In order to avoid even the suggestion that the A. Ph. A. Convention be thus taken advantage of, it has been suggested that the American Pharmaceutical Association hold its convention the week after the U. S. P. Convention.

On the other hand it has also been suggested that it is at the A. Ph. A. Convention in the decennial year where the pharmacopœial problems of the decennium are brought together and carefully considered. Any political activities at this meeting will thus be obvious and preparation to frustrate them can be made. Postponing the A. Ph. A. Convention would not prevent political organizations from

holding meetings of their own and springing their propositions as surprises at the Pharmacopœial Convention. Question No. 3 is, therefore, worthy of your careful consideration.

(3) Do you favor requesting the AMERICAN PHARMACEUTICAL ASSOCIATION to hold its annual meeting in the Pharmacopœial Convention year, after the Convention rather than before the Convention?

4. ELECTION OF MEMBERS TO THE U. S. P. REVISION COMMITTEE.

The first consideration in pharmacopœial work is the assurance of a Revision Committee personnel, individually qualified and willing to carry their share of the task of revision, which has now become so enormous. It is also essential that the persons selected should be so situated as to be able to carry out the work. It has been previously ruled and is generally accepted that a person to be eligible for membership on the Committee of Revision must have been an accredited delegate present at the current convention. Such a ruling may deprive the Pharmacopœia of the services of the individual who might measure up to the highest standard of scientific accomplishment and who might be qualified, willing and able to serve it to great advantage, if that individual:

(*a*) is financially, or for other reasons, unable to attend the convention, or

(*b*) is a member of a large association or a faculty member of a college, where the three delegates are selected by priority of age, time of service or for political or personal reasons.

For obvious reasons it would seem unwise to do away with this ruling entirely, yet it seems advisable that some sort of a plan should be adopted by which specially qualified individuals could serve on the Committee of Revision even though they have not been present at the convention.

(4) Do you favor the present ruling being changed to the effect that persons to be eligible to membership on the Committee of Revision must be accredited delegates present at the current convention, except that in certain cases, individuals specially qualified to serve because of the exceptional service they can render and are willing and able to give, may be elected to membership on the Committee without having been accredited delegates provided such individuals are elected to the Committee by an eighty per cent vote of the Convention, or, in filling a vacancy during the decennial period, by a vote of at least eighty per cent of the members of the Committee of Revision?

5. QUALIFICATIONS FOR MEMBERSHIP ON THE U. S. P. COMMITTEE OF REVISION.

The U. S. P. standards and methods of testing an assay must pass to-day, acceptably, the most exacting demands of scientific workers both in this country and abroad. As was mentioned in Item 4, it is becoming of increasing importance that the personnel of the Revision Committee must consist of members who are individually *qualified* and *willing* to carry their share of the enormous task of continuous revision. Under the present "set-up," the Convention has no means of knowing either the qualifications or the willingness of an individual to participate in pharmacopœial revision. It seems to be without question that such information should be available to the convention and should be the principal qualification justifying the election of an individual to the Committee of Revision.

(5) Do you favor the issuing of questionnaire blanks to be filed for each person placed in nomination for the Committee of Revision, the blanks to carry information on professional and academic accomplishments; the blanks then to be distributed in the convention before the votes are called?

6. CLOSING OF DELEGATION LISTS.

(6) Do you favor the closing of the delegation lists at least thirty days before the convention so that the Credentials Committee may have sufficient time to check the certificates?

May we ask again that you consider the questions carefully and mail the reply-card on pages xv and xvi, in Advertising Section, promptly, thus aiding the Committee in its work?

A. PH. A. Committee on U. S. Pharmacopœia

HARRY E. BISCHOFF
CLIFFORD C. GLOVER
WILLIAM J. HUSA
LYMAN F. KEBLER
H. EVERT KENDIG
ARTHUR P. MARKENDORF
ARTHUR F. SCHLICHTING
FRANK O. TAYLOR
ARNO VIEHOEVER
ELMER H. WIRTH, *Chairman*.

GOING BACK TO THE FOUNDING OF THE A. PH. A.

"According to the *Pharmaceutical Journal and Pharmacist* of October eleventh, each week a list is published by the United States authorities of products offered for importation at American ports which were 'detained' because they were found on inspection to be adulterated or misbranded. The lists of the goods detained in the first fortnight of November include, among others, the following drugs: Aloes, cassia oil, coriander seed, nutmeg, fennel seed, honey, Irish moss, jalap root, poppy seed and titles which were refused entry were large; thus there were some 150 cases of aloes, 600 bags of coriander seed, 50 bags of jalap root, and thirteen bales of stramonium leaves. In the official lists the reasons for detention are stated concisely; the coriander seed, the fennel seed and the poppy seed were 'filthy;' the nutmegs were moldy; the cassia oil contained resin and heavy metals; the aloes in some cases contained excessive moisture, and in other cases the total ash was too large; the jalap was deficient in resins, and the stramonium leaves were deficient in alkaloids. In addition to the simple products which were detained during the fortnight, substantial quantities of 'medicinal preparations' were refused entry at the ports because the labels on them made 'false therapeutic claims' or 'other misleading statements.' This inspection of goods offered for import at United States ports is a custom of long standing. In his book, 'A History of Pharmacy,' James Grier recalls that so far back as the middle of last century it was found that the drugs imported into America from Great Britain were 'so infamously adulterated' that in self defense the American authorities were driven to appoint inspectors and examiners at the places of import, 'and the quantities of damaged and adulterated drugs rejected by them were enormous.' This system of inspection has been carried on ever since then, and the quantities rejected are still 'enormous,' but their origin is not Great Britain, although the discarded imports may in some cases be re-exported from this country in the original packages, the condition of the contents of which are unknown to those who effect the transhipment. The important question is 'where do these goods to which the United States authorities forbid entry find a market eventually?' Who buys the filthy, moldy and adulterated drugs? India in the past has been one of the dumping grounds for rubbish; but fortunately that destination will soon be crossed off the list of receivers of such things, for, as was recently reported in *The Journal*, a bill is before the Indian Legislative Assembly, which aims at stopping the importation of adulterated drugs. Where does the inferior merchandise go? There is no law to prevent its entry at United Kingdom ports. Is it not time His Majesty's Government followed the example set by the United States more than eighty years ago?"

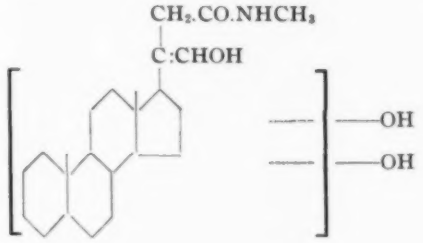
SCIENTIFIC SECTION

BOARD OF REVIEW OF PAPERS.—*Chairman*, F. E. Bibbins; H. M. Burlage, W. G. Crockett, E. V. Lynn, C. O. Lee, L. W. Rising, L. W. Rowe, Heber W. Youngken, Ralph E. Terry, Carl J. Klemme.

THE POTENCY OF ERYTHROPHLEUM ALKALOIDS.*

BY K. K. CHEN, CHESTER C. HARGREAVES AND WILLIAM T. WINCHESTER.[1]

In 1875 Gallois and Hardy (1), (2) first succeeded in isolating the alkaloid erythrophleine from the African sassy bark (*Erythrophleum guineense*, family leguminoseæ). For fully sixty years erythrophleine remained the only alkaloid known to have a digitalis-like action upon the heart, although scientific investigations were made repeatedly by Harnack and Zabrocki (3), Harnack (4), Kralsheimer (5), Power and Salway (6) and Maplethorpe (7). Other species of *Erythrophleum* were also studied such as *E. couminga* by Gallois and Hardy (2), *E. laboacherii* by Petrie (8), and *E. lasianthum* by Kamerman (9), but no new alkaloid was reported. Brill and Wells (10) stated that the bark of *E. densiflorum* of the Philippine Islands yielded no alkaloidal constituents. It was not until 1935 that Dalma (11) separated four other alkaloids from the bark of *E. guineense:* Cassaine, $C_{31}H_{39}O_4N$, cassaidine, $C_{24}H_{42}O_5N$, *nor*-cassaidine, $C_{23}H_{41}O_5N$, and homophleine $C_{56}H_{88}O_9N_2$. The first three are crystalline while the last one is amorphous. Their toxicity and general action in frogs, rats and rabbits have been tested by Santi and Zweifel (12). Dalma (13) has explored the chemical structures of his new alkaloids, and has come to the conclusion that they are probably derivatives of cyclopentenophenanthrene with a side chain of methylamide coupled with a hydroxy acid. Thus, for cassaine the following formula has been suggested:



If the above structure[2] can be substantiated, it will then become clear that all the cardiac substances—glycosides, bufagins, bufotoxins and *Erythrophleum* alkaloids—have the cyclopentenophenanthrene ring system. One difference should be noted, that is, the alkaloids, unlike the glycosides, bufagins and bufotoxins, are devoid of the unsaturated lactone group which proves to be so indispensable for the cardiac action of non-alkaloidal compounds. It is also difficult to conceive how the methylamide can easily form salts with mineral acids as Dalma's new alkaloids do.

Through the courtesy of Professor Gustavo Dalma, Provincial Chemical Laboratory, Fiume, Italy, we were in possession of three alkaloids which he isolated from *Erythrophleum guineense*—cassaine, *nor*-cassaidine and homophleine. In addition, he was generous enough to supply us acetyl-cassaine, a derivative of

* Read before Scientific Section, A. PH. A., New York meeting, 1937.

[1] From the Lilly Research Laboratories, Indianapolis, Indiana.

[2] While this paper was in press, a private communication from Professor Dalma was received. He stated that further chemical studies, made by himself but not yet published, confirmed his assertion that cassaine was a derivative of cyclopentenophenanthrene, although it might have to be modified in order to conform to the structure of etiocholanic acid. He also mentioned that the absence of an unsaturated lactone ring had been verified.

cassaine, and two new crystalline alkaloids named coumingine and coumingaine which he obtained from *Erythrophleum coumingo*, and upon which he had not, at the time of our writing, made any publications. Cassaine, acetyl-cassaine, *nor*-cassaidine, coumingine and coumingaine were in the form of hydrochlorides while homophleine was in the form of bisulfate. As expected, they were all very soluble in water suitable for pharmacological experiments. Our data on erythrophleine sulfate have been published in a previous report (14). In the present investigation, the five new alkaloids and one derivative were subjected to assays and studies similar to those described in our preceding papers (14), (15).

The essential results are shown in Tables I, II and III and summarized in Table V. It should be noted that coumingine hydrochloride is the most potent and toxic member of the group, having an activity in cats equal to that of scillaren A. Coumingaine hydrochloride, *nor*-cassaidine hydrochloride, cassaine hydrochloride and homophleine bisulfate are all weaker than the well-known alkaloid erythrophleine sulfate. The figures for homophleine undoubtedly will be revised when, by improved methods, the alkaloid can be obtained in crystalline instead of amorphous form.

TABLE I.—CAT UNITS OF COUMINGINE, COUMINGAINE, NOR-CASSAIDINE, CASSAINE, ACETYL-CASSAINE AND HOMOPHLEINE.

Drug.	Solution.	Cat Number.	Sex.	Weight, Kg.	Fatal Dose, Mg. per Kg.
Coumingine hydrochloride	1:100,000	1808	M	2.020	0.185
		1809	F	2.408	0.128
		1810	M	1.637	0.193
		1811	M	2.889	0.152
		1812	M	2.903	0.120
		1813	M	2.538	0.112
		1814	M	2.486	0.170
		1815	M	2.600	0.148
		1816	M	2.547	0.163
		1817	M	2.210	0.110
Coumingaine hydrochloride	1:20,000	1909	M	2.448	0.587
		1910	M	1.881	0.536
		1911	F	2.195	0.569
		1912	M	1.744	0.363
		1913	M	2.321	0.515
		1914	M	2.045	0.406
		1930	M	2.403	0.450
		1931	M	2.979	0.415
		1932	M	2.452	0.348
		1937	F	1.934	0.488
nor-Cassaidine hydrochloride	1:20,000	1770	F	2.319	0.688
		1772	M	2.061	1.144
		1774	F	2.363	0.677
		1775	F	1.980	0.569
		1776	M	2.324	1.274
		1778	F	2.691	0.725
		1780	M	2.669	0.393
		1781	F	1.834	0.631
		1782	M	1.730	0.350
		1783	M	1.800	0.919
Cassaine hydrochloride	1:20,000	1764	F	2.260	1.170
		1765	F	1.929	1.298
		1766	F	2.195	2.191
		1767	F	2.083	0.806
		1768	F	2.353	1.292
		1769	M	2.583	0.964
		1771	F	2.443	0.978
		1773	M	2.888	1.118
		1777	F	2.122	0.848
		1779	F	2.640	0.922
Acetyl-cassaine hydrochloride	1:20,000	1934	F	1.890	2.053
		1935	F	1.975	1.281
		1936	M	2.512	1.330
		1938	F	2.230	2.348
		1939	M	2.905	2.077
		1940	M	1.807	1.541
		1941	M	2.234	1.759
		1942	F	2.104	2.766
		1943	F	2.026	1.478
		1969	M	2.265	2.318
Homophleine bisulfate	1:10,000	1818	M	2.340	1.487
		1819	M	2.987	2.072
		1820	F	2.065	2.300
		1821	M	1.924	2.599
		1822	M	1.981	2.655
		1823	M	2.516	1.228
		1824	M	2.406	1.444
		1825	F	1.949	1.662
		1826	M	1.680	1.667
		1829	F	2.443	1.772

TABLE II.—MINIMAL SYSTOLIC DOSES OF COUMINGINE, COUMINGAINE, CASSAINE, NOR-CASSAIDINE ACETYL-CASSAINE AND HOMOPHLEINE IN FROGS.

Drug.	Solution.	Dose, Mg. per Gm.	No. in Systolic Standstill/No. of Frogs Used.
Coumingine hydrochloride	1:2000	0.00167	0/4
		0.00208	2/8
		0.00250	6/8
		0.00292	4/4
Coumingaine hydrochloride	1:2000	0.00417	0/4
		0.00500	1/4
		0.00583	0/4
		0.00667	4/4
	1:500	0.00833	4/4
		0.01667	4/4
		0.02500	4/4
Cassaine hydrochloride	1:200	0.01667	0/8
		0.01875	3/4
		0.02083	4/4
		0.02500	3/4
		0.04167	4/4
nor-Cassaidine hydrochloride	1:200	0.01667	0/4
		0.01875	1/4
		0.02083	4/4
		0.02500	4/4
		0.04167	4/4
Acetyl-cassaine hydrochloride	1:200	0.02083	0/4
		0.02500	2/8
		0.02916	3/4
		0.06250	4/4
Homophleine bisulfate	1:200	0.02083	0/4
		0.02500	0/4
		0.03333	2/8
		0.03750	3/4
		0.04167	3/4
		0.06250	4/4

TABLE III.—EMESIS AND PERSISTENCE OF ACTION OF COUMINGINE, COUMINGAINE, NOR-CASSAIDINE, CASSAINE, ACETYL-CASSAINE AND HOMOPHLEINE IN CATS.

Drug.	Cat Number.	Sex.	Body Weight, Kg.	Initial Dose Injected Intravenously, Mg. per Kg.	Vomiting Occurred.	Final Fatal Dose (Exclusive of Initial Dose), Mg. per Kg.	Interval between Initial and Fatal Doses, Hours.
Coumingine hydrochloride	1844	F	2.051	0.060	0	0.143	5.3
	1845	F	2.606	0.070	0	0.163	5.5
	1851	M	2.593	0.080	0	0.125	5.0
	1852	M	1.986	0.080	0	0.159	5.5
	1848	F	1.973	*0.090*	+	0.116	6.7
	1854	F	1.940	*0.090*	0	0.088	23.5
	1855	M	2.537	*0.090*	+	*	...
	1849	F	1.821	0.110	+	*	...

TABLE III.—EMESIS AND PERSISTENCE OF ACTION OF COUMINGINE, COUMINGAINE, NOR-CASSAIDINE, CASSAINE, ACETYL-CASSAINE AND HOMOPHLEINE IN CATS.—(*Continued from page 11*).

Coumingaine hydrochloride	1945	M	2.848	0.100	0	**	...
	1927	M	3.166	0.150	+	0.490	2.5
	1947	F	2.345	0.150	0	**	...
	1950	F	2.337	0.150	0	**	...
	1928	M	2.400	*0.175*	+	0.478	3.5
	1951	F	2.086	*0.175*	+	**	...
	1923	F	2.293	0.200	+	0.373	5.5
	1929	F	2.162	0.200	+	0.342	23.0
	1926	M	2.837	0.250	+	0.293	21.5
	1925	M	2.564	0.300	+	0.413	22.5
nor-Cassaidine hydrochloride	1792	F	1.702	0.100	0	**	...
	1797	F	2.258	0.100	0	**	...
	1798	F	2.359	0.125	+	**	...
	1799	F	1.715	0.125	0	0.912	2.0
	1795	F	2.349	0.150	+	0.368	28.0
	1800	F	2.217	0.150	0	0.539	12.2
	1801	M	1.788	0.175	0	0.450	50.0
	1793	F	2.213	0.200	+	0.441	28.5
	1796	F	2.396	0.200	0	0.244	52.0
	1802	M	2.763	0.200	0	0.289	24.0
	1803	M	1.810	0.225	0	0.273	23.4
	1804	F	1.616	0.225	+	0.743	1.5
	1805	F	2.065	0.225	0	0.246	23.5
	1806	F	2.248	*0.250*	0	0.327	20.0
	1835	M	2.350	*0.250*	+	0.438	72.0
	1836	F	1.879	*0.250*	+	0.886	150.0
	1807	M	1.985	0.275	0	0.353	18.0
	1834	F	2.095	0.275	+	0.563	149.0
	1791	F	2.320	0.300	+	0.528	22.5
	1794	F	1.694	0.500	+	0.360	24.0
Cassaine hydrochloride	1786	M	2.810	0.300	0	0.389	26.0
	1789	F	2.306	0.300	0	1.316	1.0
	1830	F	2.695	0.350	0	0.285	48.0
	1832	M	3.174	0.350	0	0.351	72.0
	1831	F	1.871	*0.375*	+	*	...
	1833	M	2.398	*0.375*	+	*	...
	1787	M	1.590	0.400	+	1.085	5.5
	1790	M	2.140	0.400	+	0.378	24.0
	1788	F	1.948	0.500	+	**	...
	1785	M	2.704	0.600	0	***	...
	1784	F	1.786	0.800	0	0.386	24.0
Acetyl-cassaine hydrochloride	1946	M	2.759	0.200	0	0.850	2.3
	1955	M	2.417	0.250	0	2.164	3.3
	1949	F	2.905	0.300	0	1.148	5.0
	1954	M	2.943	0.300	+	0.880	22.0
	1956	M	2.493	0.300	0	**	...
	1953	M	2.762	*0.325*	+	2.190	24.0
	1957	M	2.794	*0.325*	0	**	...
	1958	F	1.861	*0.325*	+	1.478	16.8
	1952	F	2.252	0.350	+	2.527	23.5
	1948	M	2.477	0.400	+	1.053	24.0
	1944	F	2.054	0.600	+	0.842	30.0

TABLE III.—(*Continued from page 12*).

Homophleine bisulfate	1840	M	2.910	0.100	0	2.72	2.5
	1841	M	2.920	0.200	0	1.94	2.5
	1842	M	3.088	0.250	0	2.74	3.5
	1843	F	2.227	0.275	0	1.49	24.5
	1839	M	2.890	0.300	+	*	...
	1846	F	1.911	0.400	0	2.11	25.5
	1838	M	2.648	0.500	+	1.89	48.5
	1853	M	2.723	0.500	0	4.00	25.3
	1856	F	2.048	0.500	0	2.03	72.0
	1857	F	2.442	0.550	0	**	...
	1850	F	1.860	0.600	+	*	...
	1858	M	1.827	0.600	0	2.35	73.0
	1860	M	2.423	0.650	0	*	...
	1862	M	2.489	0.650	0	**	...
	1861	F	1.824	*0.675*	0	2.60	76.0
	1863	M	2.418	*0.675*	+	**	...
	1864	M	2.394	*0.675*	+	**	...
	1847	M	2.041	0.700	+	3.92	29.0
	1859	M	2.146	0.700	+	1.38	75.5
	1837	F	1.868	0.900	+	*	...

* Found dead over night or later.
** Not determined.
*** Died in 6 minutes.

TABLE IV.—LOCAL ANESTHETIC ACTION OF COUMINGINE, COUMINGAINE, CASSAINE, ACETYL-CASSAINE, NOR-CASSAIDINE AND HOMOPHLEINE.

Drug.	Concentration.	Average Duration of Anesthesia, Minutes. Guinea Pigs' Skin (Intracutaneous).	Rabbits' Cornea (Instillation).
Coumingine hydrochloride	1:10,000	49	210+
	1:50,000	26	183
	1:100,000	None	59
Coumingaine hydrochloride	1:400	460+	420+
Cassaine hydrochloride	1:400	66	176
Acetyl-cassaine hydrochloride	1:400	454+	32
nor-Cassaidine hydrochloride	1:400	82	128
Homophleine bisulfate	1:400	152	480+

TABLE V.—SUMMARY OF THE ESSENTIAL RESULTS ON ERYTHROPHLEUM ALKALOIDS.

Drug.	Cat Unit (Mean ± Probable Error), Mg. per Kg.	Frog Minimal Systolic Dose, Mg. per Gm.	Cat Minimal Emetic Dose, Mg. per Kg.
Coumingine hydrochloride	0.148 ± 0.006	0.00250	0.090
Coumingaine hydrochloride	0.468 ± 0.018	0.00667	0.175
Cassaine hydrochloride	1.153 ± 0.080	0.01875	0.375
Acetyl-cassaine hydrochloride	1.895 ± 0.105	0.02916	0.325
nor-Cassaidine hydrochloride	0.737 ± 0.057	0.02083	0.250
Homophleine bisulfate	1.889 ± 0.106	0.03750	0.675
Erythrophleine sulfate	0.374 ± 0.017	0.01100	0.300

Their potency in frogs is uniformly lower than in cats when compared with the glycosides. For example, the cat unit of both coumingine hydrochloride and scillaren A is 0.15 mg. per Kg., but the frog minimal systolic dose of the former is 0.0025 mg. per Gm. and that of the latter 0.007 mg. per Gm. (fully $3^1/_2$ times as active).

Regarding the emetic action, the newer alkaloids are more powerful than erythrophleine sulfate (Table V). The cat minimal emetic doses of *nor*-cassaidine hydrochloride, cassaine hydrochloride, homophleine bisulfate, coumingaine hydrochloride and coumingine hydrochloride are 33, 33, 36, 37 and 60 per cent of their cat units, respectively, while that of erythrophleine sulfate amounts to 81 per cent of its cat unit.

There is a peculiar phenomenon about the persistence of action of three of the *Erythrophleum* alkaloids, coumingine, cassaine and homophleine. As shown in Table III, the final fatal doses are large and lie within normal ranges (compare Table I) if they are determined 1 to 24 hours after the initial dose, but they become small if they are determined after an interval of more than 24 hours from the initial dose. As a matter of fact, 2 cats died with doses of coumingine hydrochloride smaller than its cat unit, and two others similarly died with doses of cassaine hydrochloride smaller than its cat unit, a few days after the injection. It seems that these substances become more toxic after they remain in the circulation for some time; or, in other words, the myocardium gradually accumulates coumingine, cassaine or homophleine, which exists extracardially at, and following, the time of injection.

In all instances, the action of the alkaloids upon the heart appeared promptly, contrary to that of digitoxin. For example, bradycardia occurred early during the determination of the fatal dose, and vomiting usually took place within 15 minutes after administration of adequate doses.

Acetyl-cassaine is definitely weaker in cardiac action than cassaine—approximately 64 per cent less potent in cats and 55 per cent less potent in frogs. On the other hand, its emetic action is slightly stronger than that of cassaine, being 13 per cent more efficient. These results are similar to those of acetyl-cino-bufagin when compared with cino-bufagin (16). It appears that acetylation in their molecules reduces the effect on the heart but does not diminish their emetic action.

Of the *Erythrophleum* alkaloids, cassaine causes stiffening of muscles and tonic convulsions in both frogs and cats. The convulsions in frogs cease after the destruction of the brain. The central stimulating effects of cassaine are similar to those of digitoxigenin (17) and some of the bufagins such as cino-bufagin (18). No such action was observed in cats with sublethal doses (50 per cent of the cat unit or less) of coumingine, coumingaine, *nor*-cassaidine or homophleine. Acetyl-cassaine also causes convulsions in frogs, but its central stimulating action seems to be less powerful although it will require more studies to settle this point.

When the alkaloids were placed upon the human tongue, a bitter taste was noted. In each case a 0.25 per cent solution was employed. Numbness of variable degrees was noted. The effect of cassaine hydrochloride lasted 51 minutes in one individual, that of homophleine bisulfate 44 minutes in another, that of *nor*-cassaidine hydrochloride 61 minutes in a third, that of coumingaine hydrochloride 149 minutes (average) in two others, and that of acetyl-cassaine hydrochloride 74 minutes in a sixth. The local action of coumingine on the tongue is much more intense and prolonged. Numbness and parasthesia persisted for more than $7^1/_2$ hours in one subject, and $20^1/_2$ hours in another. The following protocols may be cited for illustration:

2:21 P.M.—Subject K. K. C. received two drops of a 0.25 per cent solution of coumingine hydrochloride on the tongue. A slightly bitter taste was noted.

2:24 P.M.—Definitely bitter and acrid.

2:29 P.M.—Very pronounced bitterness and acridness.

2:34 P.M.—Bitter, numb and very acrid, reminding one of the taste of cino-bufagin.

2:42 P.M.—Marked numbness and salivation.

2:51 P.M.—Action still very pronounced.

3:06 P.M.—The tongue seemed thick; drinking water tasted like a sodium bicarbonate solution.

3:34 P.M.—Feeling better.

3:57 P.M.—Action was still there.

6:00 P.M.—Unable to taste food at dinner table.

8:30 P.M.—Effect was still present, but much weaker.

10:00 P.M.—Numbness and other peculiar sensations practically all disappeared.

Following the methods of Schmitz and Loevenhart (19) and Rose (20), these alkaloids were further tested on the rabbit's cornea by local application and in guinea pigs by intracutaneous injection. Local anesthesia was uniformly observed. Table IV shows the average duration of action in groups of 3 animals with each compound. Although their local anesthetic action is well pronounced, neither of the substances can be advocated for clinical use, because each of them produces irritating signs either by instillation into the eye or by infiltration. Furthermore, their cardiac action contributes an additional risk.

Like bufagins, bufotoxins and cardiac glycosides, the *Erythrophleum* alkaloids raise blood pressure in cats in sublethal doses, and stimulate both isolated rabbits' intestines and guinea pigs' uteri in dilute concentrations.

SUMMARY.

The potency of five natural cardiac *Erythrophleum* alkaloids and one derivative—coumingine, coumingaine, *nor*-cassaidine, homophleine, cassaine and acetyl-cassaine—has been carefully determined in cats and frogs.

Coumingine hydrochloride is the most potent member; its cat unit is approximately the same as that of scillaren A. The remaining new alkaloids, coumingaine, cassaine, *nor*-cassaidine and homophleine, are less potent than the older substance erythrophleine.

The emetic action of coumingine, coumingaine, cassaine, *nor*-cassaidine and homophleine is relatively more powerful than that of erythrophleine.

Acetyl-cassaine is less potent on the heart than cassaine, but slightly more effective in causing vomiting, Gm. for Gm.

All the newer alkaloids have a local anesthetic action upon the rabbit's cornea and the guinea pig's skin. They are bitter to the taste and produce numbness and parasthesia of the tongue in men by local application. Their irritating effects and predominant cardiac action preclude their clinical usefulness.

Like other cardiac substances, the newer *Erythrophleum* alkaloids raise blood pressure in cats, and stimulate isolated rabbits' intestines and guinea pigs' uteri. Cassaine in addition causes convulsions in frogs and cats.

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BIOTOXICOLOGY. I. METHODS.

BY JAMES C. MUNCH.*[1]

The usual methods for extraction of poisons from the viscera yield impure extracts, which often fail to give typical reactions with alkaloidal reagents. Elaborate systems of purification are required to separate the toxic principles from the fats, resins and degradation products simultaneously extracted from the tissues, and such purification is associated with significant loss of the poison.

The classical method of Stas was developed for the separation of Nicotine. Stas coagulated albuminoids with alcohol and oxalic acid, hoping to dissolve out the poison as the oxalate. After filtration from the tissues, the alcoholic solution was concentrated, and efforts made to purify the alkaloid, by making the solution alkaline with either the hydroxide, bicarbonate or carbonate. The free alkaloid was shaken out with ether, and evaporated to give the final product.

This Stas method was subsequently modified by J. and R. Otto in several particulars. Tartaric acid was used instead of oxalic, since the alkaloidal tartrates are more soluble in alcohol. The ether extraction of the acid alcoholic solution removed a large proportion of the fats, glucosides and organic acids. The aqueous solution, after evaporation of alcohol, was made alkaline with sodium bicarbonate, and the alkaloids extracted by ether. On evaporation the residue was much purer than that obtained by the Stas method.

Dragendorff macerated the minced viscera with water, acidulated with sulfuric acid to coagulate the albuminoids and to convert the alkaloids into sulfates. The aqueous solution of the alkaloidal sulfates is acidified and extracted, in turn, with petroleum ether, benzene and chloroform. The residual solution is made alkaline and extracted, seriatim, with petroleum ether, benzene, chloroform and amyl

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* Scientific Section, A. Ph. A., New York meeting, August 1937.

[1] Joint communication from John Wyeth & Brother Inc., and College of Pharmacy, Temple University, Philadelphia, Pa.

alcohol. Each of these solutions is filtered through dry paper, concentrated to a small volume on a water-bath, and tested.

Ogier, Douris and others have modified a few of the details of the Stas-Otto-Dragendorff method. Citric acid has been used instead of tartaric acid. Absolute alcohol is added to the viscera, then the material incubated for 12 to 24 hours for complete extraction. After filtration, the alcohol is removed by general heating on a water-bath, the residue taken up in water, and filtered. The aqueous solution is evaporated on the water-bath, taken up in absolute alcohol and filtered. This alternate treatment is continued until a colorless, or very lightly colored, aqueous solution is obtained (1–12, incl.). However, this modification still yields chemically impure residues for identification.

TABLE I.—SEPARATION OF COMMON POISONS FROM VISCERA.

I. VOLATILE POISONS:

Acidify the minced viscera with tartaric acid, and steam distill:

A. *Acid Distillate* may contain:

Alcohols (methyl, ethyl, amyl)	Chloroform
Aniline	Hydrocyanic Acid
Carbon Bisulfide	Nitrobenzene
Chloral	Phenol

B. *Residue* in flask:

Cool, add *N* NaOH until alkaline to litmus, and steam distill:

(1) *Distillate* may contain:

Coniine	Nicotine	Sparteine

(2) *Residue* may be tested for inorganic poisons.

II. NON-VOLATILE POISONS:

Acidify the minced viscera with tartaric acid and absolute alcohol to $p_H 3$, and reflux. Cool and filter through paper. Wash with absolute alcohol, adding washings to filtrate; add tartaric acid if necessary, until acid to litmus:

A. *Acid Filtrate:*

(1) *Extract* with petroleum ether:

Benzoic Acid	Phenol	Picric Acid
Camphor	Pilocarpine	Salicylic Acid

(2) *Extract* with ethyl ether:

Acetanilide	Colchicine	Picrotoxin
Aniline	Barbiturates	Salicylic Acid
Antipyrine	Phenacetine	Santonin
Caffeine	Picric Acid	Sulfonal
Cantharidin	Pilocarpine	Veratrine

(3) Make filtrate alkaline with NaOH or $NaHCO_3$; *extract* with ethyl ether:

Aconitine	Colchicine	Pilocarpine
Aniline	Codeine	Quinine
Antipyrine	Ergotoxine	Scopolamine
Atropine	Hydrastine	Strychnine
Brucine	Narcotine	Veratrum
Caffeine	Physostigmine	Yohimbine
Cocaine		

(4) Re-acidify filtrate with HCl, make alkaline with NH_4OH; *extract* with ethyl ether.

Apomorphine	Morphine

(5) *Extract* filtrate with chloroform:

Caffeine	Morphine
Colchicine	Narceine

B. *Residue:*

Combine with Residue I–B–2.

C. *Miscellaneous tests on chopped viscera:*

Arecoline	Glucosides
Bromine derivatives	Lobeline
Cocaine derivatives	Muscarine
Emetine	Saponins

Since the impurities are physiologically inert, it seems desirable to apply pharmacological information to the problem of developing methods of biotoxicology, that is, confirmation of chemical tests and suggestions of the nature of the toxic principles in these extracts. The methods of injection of frogs, mice, rats and guinea pigs, tests upon the cat's pupil, taste, and tests upon isolated tissues, have been reported (6). The general distribution of poisons most commonly used, or to be expected in toxicological procedures, is given in Table I. Subsequent papers in this series will consider biotoxicological tests upon these groups of poisons.

When special information indicates the presence of a poison not listed in Table I, special methods of purification and of testing may be employed.

CONCLUSION.

Tests of chemically impure toxicological extracts may be made upon animals to confirm or to orient chemical identification.

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BIOTOXICOLOGY. II. VOLATILE POISONS.

BY JAMES C. MUNCH.*,[1]

A method for separation of the more common poisons from viscera has been reported (2, 3). Under that method, distillation with steam from the acidified viscera, and subsequently from alkalinized viscera, gave distillates which might contain volatile poisons. Because of the presence of various impurities in these distillates, chemical tests may give inconclusive results. Purification of these distillates is time consuming, and much of the toxic material may be lost.

Distillates from viscera of unpoisoned animals, while containing substances which reacted with many alkaloidal reagents, failed to produce characteristic effects upon animal tests. To assist in confirming chemical identity reactions, as well as to orient chemical methods of purification, certain biotoxicological procedures have been developed.

ACID DISTILLATE.

The volatile poisons in the distillate from the acid viscera possess characteristic odors which often furnish valuable information regarding the poison sought. However, some distillates especially from putrefied tissues have strong odors which interfere with organoleptic detection. Make up the distillate from acid viscera to a definite volume (10–25 cc.) and inject 1 cc. intraperitoneally into each of three mice weighing 10 to 15 Gm. (heavier mice may be used, but are less susceptible). Inject 0.1 cc. into each of three additional mice. Store the six animals in individual containers (1000-cc. beakers), and observe their behavior over a period of half an hour. Methyl, ethyl or isoamyl alcohol, or any of their alkyl esters, such as ethyl acetate, produce transitory stimulation, followed by depression, hypnosis, narcosis, coma and death, depending upon the quantity of the product injected. Chloroform, chloral and ether usually produce depression without preliminary stimulation. Aniline, nitrobenzene, phenol and carbon bisulfide produce marked stimulation with evidences of irritation, but rarely lead to narcosis. If animals die, the abdominal walls should be examined for evidence of irritation. Hydrocyanic acid tends to produce a vivid scarlet-red color in the venous as well as the arterial blood.

While positive animal findings must be confirmed by chemical tests, since they are not specific, negative results will suggest the absence of this group of poisons.

ALKALINE DISTILLATE.

The distillate from the alkaline viscera may show the "mouse odor" attributed to coniine.

(A) Mount a strip of muscle of the leech (Hirudo medicinalis) in 10 cc. of oxygenated frog Ringer's solution, immobilizing one end and connecting the other to a writing lever in the same manner as for the assay of pituitary extract on the isolated guinea-pig uterus. The tip of the writing lever is brought in contact with smoked paper on a slowly moving kymograph drum. After the strip relaxes to

* Scientific Section, A. PH. A., New York meeting, August 1937.

[1] I wish to acknowledge appreciation for technical assistance in connection with classification, by John O. Barnett, John Wyeth & Brother Inc., College of Pharmacy, Temple University, Philadelphia, Pa.

write a definite horizontal base line, with or without small spontaneous contractions, replace the immersion fluid with 10 cc. of frog Ringer's solution containing a concentration of 5 mg. of nicotine per liter, and allow to stand for 10 minutes. Drain off the nicotine solution and immerse the strip in frog Ringer's solution containing 4 per cent of alcohol until the writing lever has returned to its original level. By further tests on this sensitized muscle strip determine the threshold, which is usually about 0.25 mg. per liter. After the threshold has been determined, immerse the strip in a solution containing 1 cc. of distillate with 9 cc. of frog Ringer's solution. If a positive contraction is obtained, repeat with a more dilute solution; if no effect develops, repeat with a mixture of 5 cc. of distillate and 5 cc. of frog Ringer's solution. Continue with various dilutions until the threshold is determined. By this method 5 gamma of nicotine in 10 cc. (0.5 mg. per liter) may be detected and determined. Coniine requires one hundred times this concentration, while sparteine is inert.

To confirm the presence of nicotine, repeat the test on a new strip of leech muscle. A concentration of 1 mg. of nicotine per liter produces a definite sustained contraction, which is not relieved by washing with Ringer's solution, but is promptly relieved by immersion in a solution of 100 mg. of strychnine sulfate per liter. The contractions produced by coniine are shorter in duration, and are not so quickly counteracted by strychnine.

If desired, the dilutions of distillate in frog Ringer's solution may be combined, and steam distilled, or shaken out with ether, thus recovering the product originally taken for the test. In many toxicological examinations this economy of material is vitally necessary.

(B) Mount the sciatic nerve and gastrocnemius muscles of a frog weighing about 15 Gm. in the usual manner. Apply the distillate directly to the muscle, collecting the overflow for eventual recovery. Stimulate the nerve at 1-minute or 2-minute intervals, and observe the character of contractions produced. Nicotine, in a concentration of 5 mg. per liter tends to produce a persistent tonic contraction, which is quickly relieved by strychnine. Sparteine tends to depress the muscle fiber, large doses producing a curare-like paralysis (1, 5). The coniine contraction is somewhat similar to that produced by nicotine, but may be differentiated by strychnine. Exposure of the gastrocnemius muscle to concentrations of 100 mg. of strychnine sulfate per liter for 5 minutes tends to prevent subsequent coniine contractions, but does not affect subsequent tonic nicotine contractions.

(C) The injection of 0.1 to 0.2 mg. of nicotine into the lymph sac of a 15-Gm. frog causes decreased respiration and extension of the hind legs in a sitting position but the heels are not brought together. This reaction is characteristic for nicotine. It should be conducted on several frogs using a standard solution of nicotine before testing the distillate. Intraspinal injection of strychnine was 250 times as sensitive as lymph sac injections for the detection of strychnine (4). Intraspinal injections of nicotine appear to be more effective than lymph sac injections.

SUMMARY.

The following animal tests have been developed for volatile poisons:

1. Leech Muscle: Counteracted by strychnine: Nicotine.
   Less completely counteracted by strychnine: Coniine.
   Inert: Sparteine.

2. Frog Nerve-Muscle Preparation:
   Depression: Alcohol, ether, chloroform.
   Contraction: Relieved by strychnine: Nicotine.
   Prevented by strychnine: Coniine.
   Paralysis: Sparteine.

3. Frog Lymph Sac:
   Characteristic position: Nicotine.
   Negative: Coniine.

4. Mice, Intraperitoneal Injection:
   Depression: Alcohol, ether, chloroform, chloral.
   Stimulation: Phenol, aniline, carbon bisulfide.
   Blood changes, red color: Hydrocyanic acid.

CONCLUSION.

Methods of testing common poisons in the acid and the alkaline distillate from minced viscera have been developed to orient and to confirm chemical toxicological identification.

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A NEW ENTERIC COATING AND A LABORATORY METHOD FOR ITS CONTROL.*

BY A. G. WORTON, G. F. KEMPF,** P. L. BURRIN AND F. E. BIBBINS.

INTRODUCTION.

For many years enteric coatings of one kind or another have been applied to pills, capsules and tablets. In 1884, Unna (1) used keratin which was considered to be the first real enteric coating. Thirteen years later Hausmann and Weyland (2) created a new wave of interest when they developed formalin-gelatin. In 1915, Toplis (3) suggested stearic acid, and a few years later Freeman (4) supported its use as an efficient coating. Ammoniated white shellac was used by both Hilton (5) and Wruble (7), the former applying it in combination with salol. In 1932, Husa and Magid (6) reported the use of a mixture of salol, stearic acid and shellac. The most recent work was reported in June 1937 by Mills (9) who used a combination of cetyl alcohol and mastic, for which she claimed an efficiency of 98 per cent.

Generally, commercial enteric coatings have not been applied in a manner giving consistently efficient results. Also, there have been many different interpretations of a satisfactory coating. However, during the last several years radiography has been of great value in determining the behavior of tablets in the gastrointestinal tract. Bukey and Rhodes (10) in 1935 reported a wide variation in the efficiency of commercial enteric coatings, after having tested, radiographically,

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five samples of enteric coated barium sulfate tablets submitted by various pharmaceutical manufacturers.

Figure 1 shows a radiograph made by the authors one hour after the administration of six barium sulfate tablets coated with sandarac, a widely used commercial enteric coating. All but one of the tablets disintegrated in the stomach where traces of barium sulfate could be detected.

Figure 2 shows a radiograph made one and one-half hours after administration of another sample of the same tablets in another subject. That all tablets disintegrated in the stomach was evident, for the radiograph shows white blotches corresponding in position to that of the stomach.

Fig. 1.—Barium sulfate tablets coated with sandarac one hour after administration.

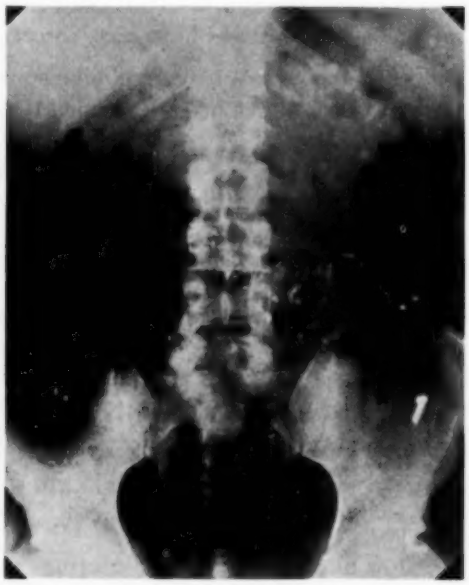


Fig. 2.—Barium sulfate tablets coated with sandarac one and one-half hours after administration.

DISCUSSION.

To understand fully what is required of an enteric coating, it is well to consider briefly the physiological activity and its variations in the alimentary tract from the stomach to the point of excretion. There are several different conditions existing in the gastro-intestinal tracts of several individuals at a given time or in one individual at different times involving p_H and motility.

The majority of workers who have been attacking the enteric problem have based their attack on the assumption that the intestinal contents are always alkaline. Such an assumption is unfounded, however, since the intestinal contents, even when passing through the ileocaecal valve into the colon, are frequently acid in reaction (11). This belief that the contents of the small bowel are always alkaline has been shaken during the past five years, for several workers have presented evidence indicating that the content of the small bowel is frequently acid in reaction. Wruble (8) pointed out the work of Bollman and Mann (12) who found

while working with dogs at the Mayo Clinic, that the reaction in both the duodenum and jejunum is acid during digestion. The p_H in the duodenum varied between 3.8 and 6.6. It follows that a tablet soluble only in an alkaline solution will frequently pass through the entire alimentary tract undissolved.

The variable of greatest importance in the alimentary tract is the emptying rate of the stomach. The length of time a coating must be stable in gastric juice in order to leave the stomach intact has been a controversial subject. One of the chief causes for variation in the emptying rate is the varied bodily activity of different individuals. Campbell and Conybeare (13) proved radiographically that the stomach of an individual who exercises regularly empties more quickly than that of an individual who does not.

Briggs (14) was cited by Wruble as an authority who studied the emptying rate of the stomach by employing a barium meal in 100 normal individuals. He found the stomach emptied in two and one-half hours in 1 per cent; three hours in 6 per cent; three and one-half hours in 9 per cent; four hours in 44 per cent; four and one-half hours in 32 per cent; and five hours in 8 per cent. From this study it may be said that the emptying time of food from the stomach in 99 per cent of patients is between three and five hours, and in 76 per cent between four, and four and one-half hours.

The diet also influences the emptying rate of the stomach. Cannon (15) in 1904 observed that the stomach of an individual emptied quickly on a carbohydrate diet, more slowly on a protein diet, and still more slowly on a fat diet.

Bukey and Brew (16) after completing a radiographic study of the emptying rate of the stomach found that the majority of tablets left the stomach in four hours, and the average emptying time was 5.9 hours. This checks closely with the work of Briggs. They concluded that the emptying rate is not influenced by the size or shape of a tablet nor by the nature of the coating.

Bukey and Brew (17) in a more recent paper reported their findings relative to the influence of diet on the time enteric coated tablets remain in the stomach. They found diets high in carbohydrate or cellulose caused tablets to pass rapidly from the stomach. Passage was less rapid on a protein diet and very slow on a fat diet. Ingestion of large volumes of water was found to retard passage of tablets from the stomach. They also reported that generally, the length of time tablets remain in the stomach increases as the day progresses, due to fatigue and slowing of peristalsis.

When acid chyme is discharged through the pylorus, it passes into the lower duodenum, and jejunum, which are best adapted for absorption. Here it remains for several hours (18). It is at this point that an enteric tablet or capsule should completely disintegrate.

In explaining the formations of feces Bodansky (11) in his "Introduction to Physiological Chemistry" states, "The intestinal contents, upon reaching the ileocaecal valve, are not like feces in appearance and composition. They are semifluid in consistency, and frequently acid in reaction, whereas the feces are usually alkaline. At this stage the intestinal contents consist largely of undigested food remnants, the remains of the digestive and intestinal secretions, and cellular elements, including cell debris from the alimentary tract. The transformation of this material into feces occurs in the large intestine where food residues remain for one or more

days. Here certain substances, especially water, are partly resorbed." Chances are great that a tablet, after having reached the colon, will be excreted intact if it has not disintegrated by the time resorption has taken place.

After having considered the physiological aspects of the problem, it appears that an efficient enteric coating should be stable for nearly six hours, and should then begin to disintegrate quickly, regardless of the p_H of the body fluid that happens to bathe it.

EXPERIMENTAL.

The authors after experimenting with a great variety of coatings used one consisting of a powdered mixture of fatty acid, wax and hygroscopic vegetable components with white shellac as a binding agent.[1] This coating involved timed disintegration and a new method of application.

Stearic acid, of which the formula consisted largely, does not become hard and brittle upon aging as do many enteric materials. Carnauba wax, which has a high melting point, was used to

Fig. 3.—Tablets of barium sulfate coated with the enteric powder eight and one-half hours after administration.

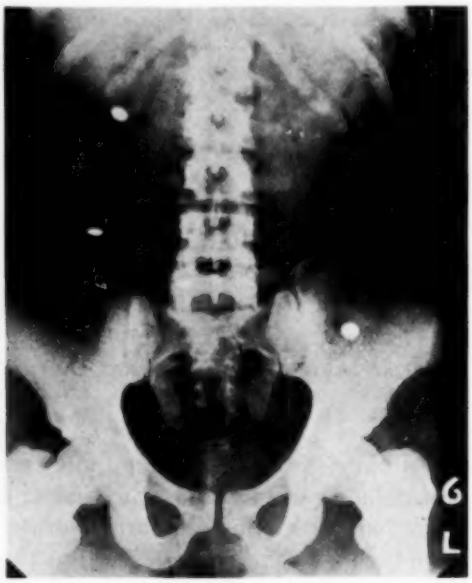


Fig. 4.—Tablets of barium sulfate coated with the enteric powder eleven hours after administration.

overcome the softness of the stearic acid and petrolatum mixture. Powdered agar, and powdered elm bark, because of their ability to absorb moisture and swell, were incorporated as mechanical agents to effect timed disintegration. The mixture was made by melting together 55.5 parts of stearic acid, 24.25 parts of carnauba wax and 1.75 parts of petrolatum, then incorporating 13.9 parts of powdered agar and 4.6 parts of powdered elm bark. Upon cooling, the mixture was ground to a powder.

In order to determine the efficiency of the coating, a large lot of tablets containing barium sulfate was made by compressing with a $^3/_8$-inch die to a thickness of 0.15 inch. The mixture from which the tablets were compressed consisted of barium sulfate 54.5 parts, starch powder 34 parts, powdered sugar 11 parts and stearic acid 0.5 parts. The large lot of tablets was divided into smaller lots of three pounds each for experimental use. Excepting a few variations, and gradually im-

[1] The patents for this coating were granted to Grover C. Miller, Alhambra, California, assignor to Kelp-O1 Laboratories, Inc., Los Angeles, California. The patent numbers are 2,011,586 and 2,011,587.

proving technique, the general procedure for coating was the same for all lots. The coating pan was of the revolving type, 16½ inches in diameter. The first step in the application of the coating was carried out by placing the tablets in the pan, then adding a solution of shellac in alcohol. (The quality of the shellac used was such that it would have been suitable for use in food products.) After the shellac had become evenly distributed over the tablets, a quantity of the enteric powder (described above) was sprinkled over them. Each tablet, due to the adhesiveness of the shellac, took up its portion of the powder to produce a smooth coating of uniform thickness. To render the coating more impermeable to fluids, the tablets were arranged in rows on an asbestos board and flamed on both sides with a Bunsen burner. This treatment caused the stearic acid and wax to melt and flow, thus forming a continuous coating. The tablets were then sugar-coated. To determine the efficiency of the coating, six tablets were administered to each of several subjects and radiographs were made at about two-hour intervals until disintegration took place. Of the first few lots that were tested radiographically, some disintegrated too quickly while others did not disintegrate quickly enough, depending upon the thickness of the coating.

Figure 3 shows a radiograph of barium sulfate tablets which were too thickly coated with the enteric powder, taken eight and one-half hours after administration. This coating required too long a time to disintegrate for they should have been completely broken up at the time the radiograph was made. However, a slight haziness around three of the tablets indicates they were in the first stage of disintegration. Figure 4 shows tablets from another lot too thickly coated, eleven hours after administration. One of the tablets administered must have been excreted or hidden behind bony structure for it is not shown. It may be noted that the outlines of these tablets are very sharply defined in the radiograph, indicating that disintegration had not yet begun. It is also interesting to note that the positions of these tablets correspond to the positions of the ascending, transverse and descending colon.

As additional lots of barium sulfate tablets were coated and tested *in vivo* radiographically, it was learned that the ideal tablets began to disintegrate after six hours, and were completely disintegrated after eight hours. This period was found to be optimal because six hours allowed enough time to accommodate the slowly emptying stomachs, and eight hours was short enough so that tablets passing from quickly emptying stomachs still disintegrated before reaching the colon.

To establish a practicable and accurate laboratory method of control, several lots of barium sulfate tablets were coated such that the thickness of each coating equaled that of the tablets found to be optimal when tested *in vivo* radiographically. The new lots, when tested *in vivo*, varied slightly in disintegration time; however, all were found to leave the stomach intact and then disintegrate in the small intestine.

Figure 5 represents a series of radiographs made at intervals recording an eight-hour history of six tablets from one of the lots, in the gastro-intestinal tract. L-1, taken four hours after administration, shows one tablet apparently in the stomach and five in the small intestine. The one which appears to be in the stomach is partially hidden by the bony structure of the spine. At this stage there is no apparent sign of disintegration. L-2, taken five hours after administration, shows six tablets in the small intestine with five of them grouped. L-3, taken six and one-half hours after administration, shows a haziness around the tablet on the upper right, and also around the one on the upper left, which signifies initial disintegration. The sixth tablet is masked by the bony structure of the spine. L-4, taken eight hours after administration, shows that four tablets have completely disintegrated and two are partially disintegrated. Similar radiographic results were obtained when checking the efficiency of many other lots of tablets similarly coated. For the sake of brevity, however, more of such series are not shown here. More than one hundred and twenty different lots of barium sulfate tablets were coated while carrying on this work.

In order to establish a correlation between tests *in vivo*, and *in vitro*, ten tablets from each of the lots found to be satisfactory when tested radiographically, were placed in test-tubes containing artificial gastric juice of the formula proposed by Toplis:

Sodium Chloride	1.400 Gm.
Potassium Chloride	0.500 Gm.
Calcium Chloride	0.060 Gm.
Hydrochloric Acid 36 per cent	6.944 Gm.
Pepsin U. S. P.	3.200 Gm.
Distilled Water *q. s.* to make	1000 cc.

The tubes were then placed in a bath having a constant temperature of 37° C. and observed every thirty minutes for disintegration. All of the samples began to disintegrate in from four hours to four hours and fifty minutes. The beginning of disintegration may be interpreted

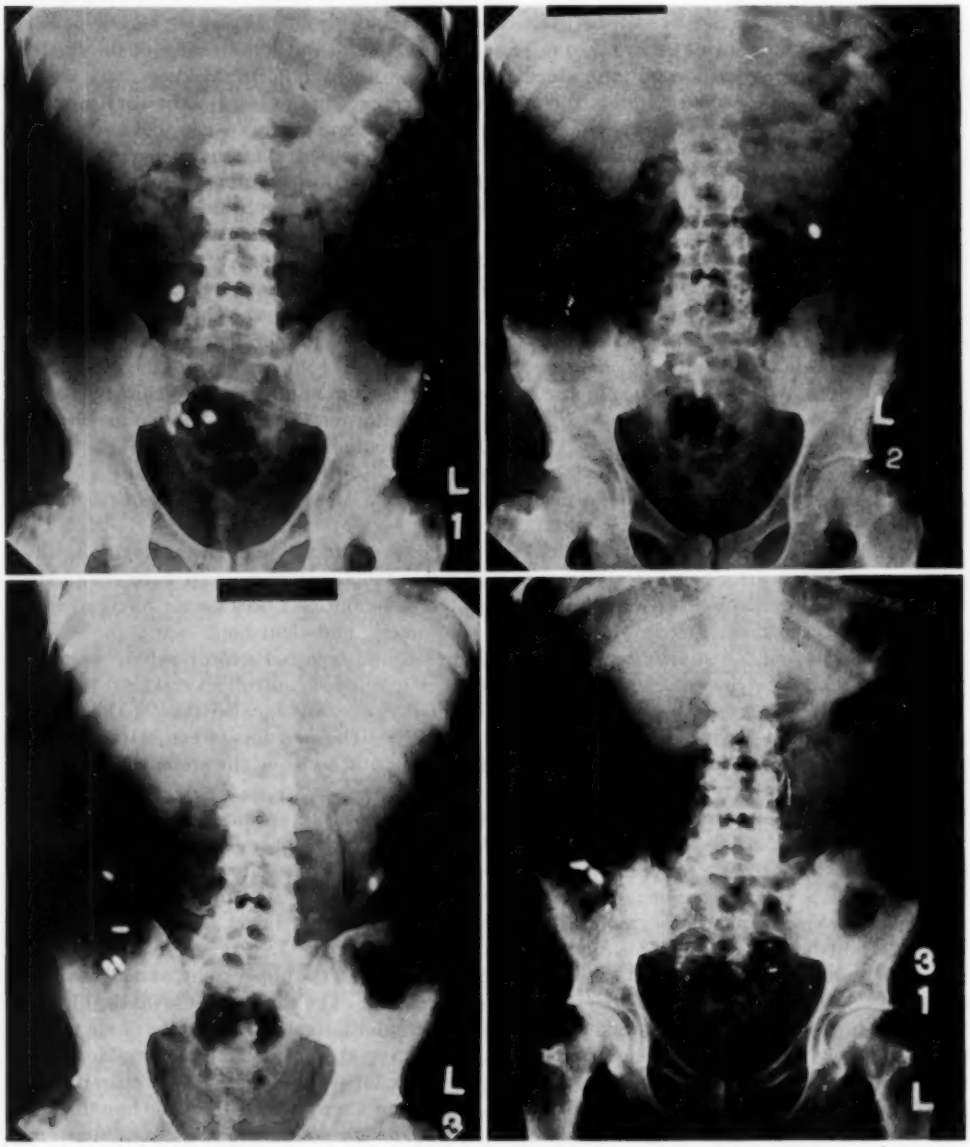


Fig. 5.

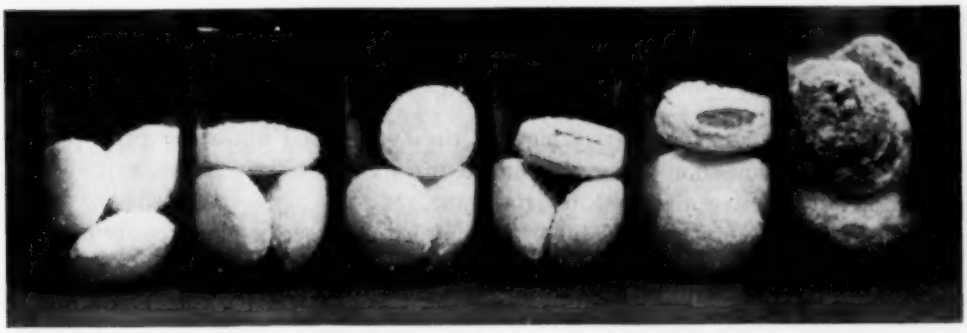
Upper Left.—Four hours after administration. Upper Right.—Five hours after administration.
Lower Left.—Six and one-half hours after administration. Lower Right.—Eight hours after administration.

here as the first appearance of a crack or fracture in the coatings of one or more of the ten tablets. This interpretation is very important for although the first signs of disintegration appeared in from four hours to four hours and fifty minutes, complete disintegration required six or more hours.

Complete disintegration may be interpreted to mean complete liberation of the barium sulfate which forms a suspension and then finally settles to the bottom of the tube. All subsequent lots which began to disintegrate in from four to five hours *in vitro*, were invariably found to be satisfactory when tested *in vivo* radiographically.

In establishing high and low limits for the disintegration *in vitro*, varying amounts of coating were added to different lots of tablets. Those which began to disintegrate *in vitro* in three hours were satisfactory only for quickly emptying stomachs. The same was true of three and one-half-hour tablets. The three and three-fourths-hour *in vitro* tablets were usually satisfactory *in vivo* but they barely cleared the stomach before disintegrating. The four- to five-hour *in vitro* tablets were invariably satisfactory. One lot which ran as high as six hours *in vitro* was found to reach the colon as shown in Fig. 4.

Figure 6 represents a series of tubes containing enteric coated 5-grain tablets of pituitary, anterior lobe, in artificial gastric juice. Because they are dark in color, pituitary tablets were used for contrast with the lighter color of the coating in the photographs of both Fig. 6 and Fig. 7. To



1 hr. 2 hrs. 3 hrs. 4 hrs. 5 hrs. 6 hrs.

Fig. 6.—Enteric coated tablets of pituitary, anterior lobe, 5 grains, in artificial gastric juice.[1]

1/2 hr. 1 hr. 1 1/2 hrs. 2 hrs. 2 1/2 hrs.

Fig. 7.—Enteric coated tablets of pituitary, anterior lobe, 5 grains, in artificial intestinal juice.[1]

show the different stages of disintegration at a given time, the tablets were placed in the tubes at one-hour-intervals through a six-hour period and then photographed.

Figure 7 shows additional samples from the same lot used for Fig. 6 in artificial intestinal fluid. This fluid contained 2.8 Gm. of pancreatin U. S. P., and 15 Gm. of sodium bicarbonate per 1000 cc. It was originally used in a pharmacopœial test for pancreatin and recommended by Toplis for enteric testing. Here, the tablets were placed in the tubes at thirty-minute intervals through a two and one-half hour period and then photographed.

[1] In some of the tubes the coating had sloughed away and hung in suspension. The suspended material hid the real effects of disintegration, therefore, fresh fluids were used to replace the cloudy fluids immediately before the photographs were taken.

From Fig. 6 and Fig. 7 it is evident that the coating is much more soluble in alkaline media than in acid media. This difference in solubility means that the disintegration will be accelerated in some individuals whose small intestines happen to be slightly alkaline. It was the experience of the authors in some radiographic studies, that in a given individual at a given time, tablets having passed from the stomach early began to disintegrate in five and one-half hours, while those having passed from the stomach late began to disintegrate in six hours. In simpler words, disintegration is oftentimes accelerated about one-half hour, due to the slight alkalinity of some intestines. It may not be assumed from this report that any barium sulfate tablet with any coating which begins to disintegrate in from four to five hours in artificial gastric juice will be highly efficient *in vivo*. The coating herein described is dependent upon its moisture-absorbing property and the correlation established between the tests *in vivo* and *in vitro* might not hold for any other type of coating.

The nature of the tablet being coated influences, somewhat, the manner in which it will disintegrate. A hard tablet which dissolves at the surface requires a longer time to disintegrate than does a tablet which may be made quickly disintegrating by the addition of starch. Work will be continued in this direction.

CONCLUSIONS.

1. Efficient enteric coated tablets of the type based upon the principle of timed disintegration should begin to break up *in vivo* after six hours, and should be completely disintegrated within eight hours.

2. The disintegration time of the coating herein described may easily be controlled because of the moisture-absorbing and swelling properties of its vegetable components.

3. A laboratory method of control for enteric coated tablets may be established by correlating the disintegration time *in vitro* with that *in vivo* of enteric coated barium sulfate tablets found to be efficient radiographically.

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REPORT OF THE MARIHUANA INVESTIGATION.*

(SUMMER OF 1937.)

BY H. J. WOLLNER, JOHN R. MATCHETT, JOSEPH LEVINE AND PETER VALAER.

With the recent passage of the Marihuana Act, controlling the growth and traffic of the plant Cannabis sativa, there fell upon the Bureau of Narcotics, of the United States Treasury Department, the responsibility of assembling all significant data based upon which competent administration of the law might obtain.

In order that this Bureau might be in full possession of all pertinent information it was decided to plant a plot of ground and observe the growing of the plant and related phenomena. It was considered that, inasmuch as the Marihuana Act provided not only for the administration and control of legitimate agriculture but also for the stamping out of illicit agriculture and traffic in the plant, it would be appropriate to gather information based upon which the most effective pursuit of criminal activities might obtain. To assist in accomplishing these ends an extensive comparative study was also made of the findings of experts, including those who, in the past, had been consultants to the Health Committee of the League of Nations.

The various tests which had hitherto been found at least partially effective in the detection of the plant Cannabis sativa were applied to the crop obtained by this planting throughout its various stages of growth. This was done in an effort partly to determine the time and nature of development of the active principles in the plant and, in part, to gage the effectiveness of such control measures as proper administration of this law would require.

Early in the investigation it was discovered that the chemical methods hitherto developed and proposed for the identification of this plant were not universally effective. This factor, arising early in the investigation, compelled those engaged upon the research to partially modify their approach to the problem.

In submitting this report, therefore, it is desirable to stress the point that whereas the original purpose of the investigation, and the basis upon which it was planned, was a study of the growth of the plant and the time of appearance therein of those components which collectively are referred to as active principles, nevertheless, other factors having arisen during the progress of the research, the ultimate results obtained appear to challenge the previously proposed methods of analysis when used for identification purposes.

ORIGINAL PURPOSE OF THE INVESTIGATION.

The purpose of the investigation here reported originally was as follows:

1. To observe the growth of the plant Cannabis sativa.
2. To determine the time of appearance and disappearance in the plant of those substances responsible for the alkaline and acid Beam tests.
3. To determine whether or not the substances referred to exist in all parts of the plant and at all stages of growth.
4. To determine whether all plants, including male and female, grown in the same plot and dried under the same conditions, respond at each stage of growth to the alkaline and acid Beam tests.
5. To determine the effect of rapid drying on the capacity to respond to the alkaline and acid Beam tests.

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* United States Treasury Department, Bureau of Narcotics, in coöperation with the Department of Agriculture.

UNEXPECTED DEVELOPMENT.

Soon after the above program was initiated it was discovered that, contrary to expectation, Cannabis sativa plants were found which did not react to known chemical methods of identification. It was therefore concluded, as will be later developed in greater detail, that known chemical methods of testing could not be employed to observe certain of the Cannabis plants and their generation of active principle in their various stages of growth.

REVISED PURPOSE OF THE INVESTIGATION.

Under these circumstances the emphasis of the investigation was shifted and an effort was made to determine, if possible, what data could be gathered from an observation of those plants which gave tests as compared with those that did not. The investigation from this point onward was, therefore, broadly grouped under the following headings:

1. To observe the growth of the plant Cannabis sativa.
2. To standardize the method of testing the plant Cannabis sativa.
3. To observe statistical relationships, if any, obtaining between those plants which gave "positive" tests by chemical methods, and those plants which gave "negative" tests.
4. To determine the statistical relationship, if observable, between male and female plants which reacted to chemical tests.
5. To observe the time of occurrence in male and female plants of those compounds which caused "positive" reaction to chemical tests.
6. To determine the effect on the development of "positive" tests of variations in the drying of the plants.

The data developed in carrying through the above program required four months of activity by three chemists, with the occasional assistance of technologists of the Department of Agriculture. There were performed at least 3000 individual chemical tests. The farm was visited weekly and observations made. The climatic data was, of course, obtained from the Weather Bureau.

OBSERVATION OF THE GROWTH OF THE PLANT CANNABIS SATIVA.

On May 12, 1937, a plot of ground 130 feet long and 15 feet wide was selected in the lowland, near the Potomac River, of the Arlington (Virginia) Experimental Farm of the United States Department of Agriculture. Seeds of a Kentucky variety, usually cultivated for fiber, were planted in six rows, three feet apart. The young plants were not artificially thinned.

Growth during the early season was exceedingly rapid. The chronology of growth was as follows:

May 12, 1937	Seed sown
By May 17, 1937	Plant appeared above ground
By June 15, 1937	Height was $1^1/_2$ feet
By July 2, 1937	Height was 6 feet
By July 9, 1937	Height was 7 feet
By July 16, 1937	Height was 10 feet
By July 23, 1937	Height was 12 feet
By August 15, 1937	Height was from 13 to 15 feet and all male plants could be distinguished.
By September 1, 1937	The fruit had appeared and males began to wither.
By October 1, 1937	The male plants had been reduced to bare stalks, retaining, however, portions of their flowering tops.

On October 25, 1937, when the leaves were mostly gone and the stalks were more readily visible, it was found that the plot contained approximately 3100 plants of which approximately 1900 were females, and approximately 1200 were males.

ESTIMATION OF YIELD OF FLOWERING TOPS.

Since the plants in the outside rows branched much more freely than those in the inside rows it is necessary to consider them separately for the purpose of estimating the yield of female flowering tops. It was found that the tops (including fruits) from 2 female plants in the outside rows weighed a total of 660 Gm. when wet and 350 Gm. when dried. The tops (including fruits) from 4 female plants in the inside rows weighed a total of 630 Gm. when wet and 310 Gm. when dry. Since the inside rows contained two-thirds of the plants, and the outside rows one-third, the yield from the plot is estimated as 400 Kg. of tops (including fruits) when wet, and 200 Kg. when dry.

STANDARDIZATION OF METHOD OF TESTING.

Choice of Method.—After examination and laboratory comparison of most of the chemical methods hitherto proposed for the identification of the plant (including those circularized through League documents) it was found that none yielded results of greater accuracy than the one finally adopted in this investigation.

In this respect it is worthy of note that none of the other methods examined ever gave a "positive" test in a plant which tested "negative" by the adopted procedure. In addition it is essential to note that no procedure so far employed was universally effective.

The Method of Testing.—The test used in the investigation, details of which appear below, was developed in this laboratory subsequent to the observation that hitherto proposed Beam tests, and modifications thereof, are apparently adversely affected by inert colored substances extracted from the plant by petroleum ether. Preliminary experiments revealed that such substances could be removed by adsorption on Norit (decolorizing carbon) but that in petroleum ether the carbon also removed from solution the substances which respond to the tests. In further experiments it was found that the desired compounds could be released from the carbon by washing with ethyl alcohol. This led to the conclusion that alcohol could be employed as the extracting solvent. Ethyl alcohol, however, in addition extracts a very large amount of colored material. A search was therefore instituted for a solvent which would extract comparatively little color and from which the color could be removed by adsorption on Norit without sensible loss of the compounds reacting to the Beam test. Ethyl acetate proved to be such a solvent and was consequently employed in the test finally developed.

The Method of Testing Ultimately Adopted.—1. A sample averaging 1 to 6 Gm. (depending on which part of the plant was tested) was crushed in a 250-cc. beaker and covered with 50 cc. of pure ethyl acetate.

2. After extracting a few minutes two 10-cc. portions were withdrawn through a filter.

3. One portion was divided equally between two white porcelain dishes and the solvent evaporated from each on a steam-bath before a fan.

4. The second 10-cc. portion was shaken for a moment with $^1/_2$ Gm. of Norit (decolorizing carbon) and filtered. The colorless filtrate was divided between two white porcelain dishes and the solvent evaporated from each on a steam-bath before a fan.

5. One of the resinous residues obtained in step 3 and one obtained in step 4 were treated with Beam's acid reagent (a saturated solution of hydrogen chloride in absolute alcohol) and the color produced observed.

6. The other residues obtained in steps 3 and 4 were treated with a few drops of Beam's alkaline reagent (2% alcoholic potassium hydroxide) and the color produced observed.

Comment on Method.—It was found in many cases that Norit treatment was not necessary for "positive" alkaline test response. However, when the acid test was employed no instance of a "positive" response was found in the absence of Norit treatment.

It was found that the above outlined method of testing was exceedingly sensitive when compared with other similar procedures. As little as 5 mg. of crushed marihuana gave a definite color with the alkaline reagent when extracted with 3 cc. of solvent and shaken with 10 mg. of Norit.

This method was compared with those involving extraction with petroleum ether. It was found that petroleum-ether extracts did not give "positive" reaction in plants which gave "negative" reaction on ethyl acetate extracts.

The presence of organic peroxides in the solvent did not appear to affect the reacting of the extracts.

Considered from all points of view the procedure involving extraction with ethyl acetate, followed by decolorization, appears preferable to that employing petroleum ether.

STATISTICAL RELATIONSHIP BETWEEN "POSITIVE" AND "NEGATIVE" PLANTS.

As indicated earlier in this report it developed that individual plants, though grown side by side, varied greatly in their capacity to respond to the above tests. Many responded in widely varying degree to both tests, a considerable number responded to only one, while still others responded to neither.

The problem was attacked as follows:

Each week 10 or more plants were brought to the laboratory and dried in the air for four days at room temperature (Circa 30° C.). A portion of the top or top leaves from each plant was subjected to both tests. Those which reacted strongly to the alkaline test were designated as "positive" and those which failed to react, or reacted exceedingly faintly, were designated as "negative."

One plant of each category was selected and broken into its various parts as will be explained below. Each part of each plant was then tested separately by both the acid and the alkaline tests.

Below are listed the various parts into which the plants were divided for the purpose of determining which respond to the test. The complete subdivision was, of course, dependent on maturity. Each subdivision was added as the part in question appeared during growth and, of course, deleted after it was no longer on the growing plant. For example, the lower leaves blew off early in the decadence of the plants.

1. Tops	5. Upper stalk	9. Bracts
2. Tops of branches	6. Lower stalk	10. Fruits
3. Upper leaves	7. Stems of branches	11. Roots
4. Lower leaves	8. Flowers (of male plants)	

The attached diagram (page 33) indicates where these designations apply.

In every case where plants were found to be "positive" by the preliminary alkaline test subsequent examination of each of the subdivisions developed a "positive" alkaline test in each of such subdivisions excepting the pith, lower stalk and root.

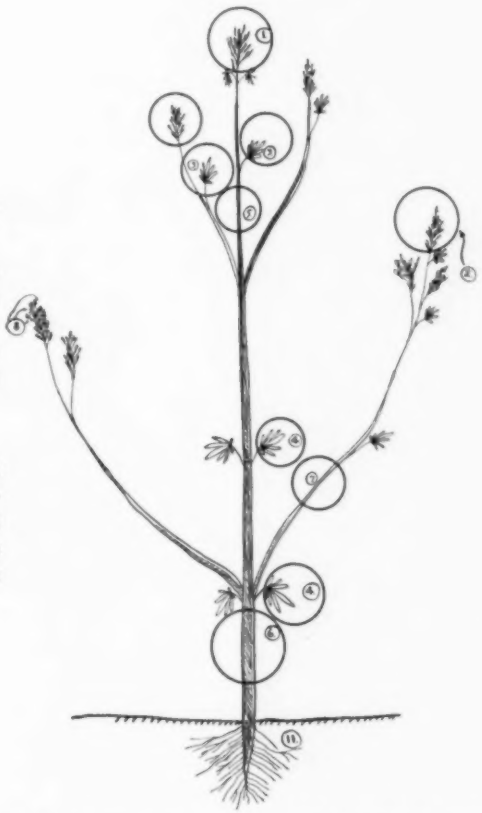
In every case where plants were found to be "negative" by the preliminary alkaline test subsequent examination of each of the subdivisions developed a

"negative" test in each of such subdivisions with, however, slight traces to be found in the upper leaves or tops.

It is to be understood, of course, that the separation into purely "positive" and purely "negative" plants is a highly empirical one and that quite a number were found between the absolutely "positive" and the absolutely "negative."

During the whole course of the research 241 plants of various ages were found to respond as follows:

120 gave both alkaline and acid tests
56 gave only the alkaline test
33 gave only the acid test
32 gave neither.



DIAGRAMMATIC SKETCH OF PLANT CANNABIS SATIVA.

1. Tops
2. Tops of branches
3. Upper leaves
4. Lower leaves
5. Upper stalk
6. Lower stalk
7. Stems of branches
8. Flowers of male plants*
9. Bracts (not shown)
10. Fruits (not shown)
11. Roots.

* These are only present on male plants but are included herewith for demonstration of position. Where flowers of male plant are referred to in report, and where tested, co-mingled leaves were removed. Where male flowering tops were referred to the entire top was tested.

Although the designation, by virtue of which plants were classified as "positive" and "negative," was made on the basis of the alkaline test, the acid test was also applied to each separate subdivision.

It appears that, where the acid test was "positive" in the tops, a corresponding "positive" acid test was generally obtained in the other subdivisions of the plant excepting, again, the pith, lower stalk and roots. *Not necessarily all of the several parts of any one plant would be "positive" in its reaction.* However, after all of these tests had been completed, it was found that each of the above enumerated parts, excepting the pith, lower stalk and roots, had yielded a "positive" test in one plant or another.

DISTRIBUTION OF "POSITIVE" AND "NEGATIVE" PLANTS WITH RESPECT TO SEX.

Examination of 108 plants of known sex revealed no relationship between sex and capacity to respond to the test. Of 41 males 27 (or 66%) were designated as "positive" and 14 (or 34%) as "negative." Of 67 females 44 (or 66%) were found "positive" and 23 (or 34%) "negative."

These figures show that there are as many "positives" in proportion to "negatives" in the males as in the females. There can also be concluded from these figures that the concentration of reactive material in the males is as great as that in the females for, inasmuch as the test is empirical, if it had been otherwise a different ratio would have obtained.

TIME OF OCCURRENCE IN THE VARIOUS PARTS OF MALE AND FEMALE PLANTS OF THE COMPOUNDS WHICH CAUSE "POSITIVE" REACTION.

Subject to the limitations referred to in the foregoing discussion, the capacity of the Cannabis sativa under observation to react to the acid and alkaline Beam tests has been determined to be as follows:

1. Dry, old fruits do not give either alkaline or acid test.
2. Tiny plants, one inch above ground, do not respond to either test.
3. Some plants, 3 inches above ground, give both tests. The plants at this stage are too small to be tested separately.
4. From this time on both tests may be obtained from all parts of both male and female plants except the pith, lower stalk and roots. The strongest tests are given by the upper parts of the plant.
5. Capacity on the part of the male plants to give both tests disappears gradually as the mature plant disintegrates, disappearing last from the dried flowers which cling tenaciously after most of the leaves have blown away.
6. Capacity on the part of the female plants to give both tests increases in the flowering tops as maturity approaches. After the fruits are formed the flowering tops of all female plants respond in some degree to the alkaline test even though no other part of the plant may react "positive." This stage of development is reached at the time the male plants are disintegrating.
7. After the fruits are mature, capacity to respond to the tests disappears in the upper stalk.
8. Flowering tops give both alkaline and acid "positive" tests even after heavy frost.

EFFECT OF RAPID DRYING PROCEDURE UPON THE RESPONSE OF CANNABIS SATIVA PLANTS TO THE BEAM TEST.

For the purpose of this test 41 plants, the sex of some of which could be recognized, were selected. A portion of each (top of branches or top leaves) was heated in an oven at 100° C. in a current of air at the same temperature. These portions were removed from the oven after intervals of from 1 to 5 hours, as indicated in the accompanying table, and then tested.

The remaining parts of these same plants were dried in the air for four days after which a portion of their tops was tested.

Of the air-dried parts of plants 34 responded "positively" in varying degree to the alkaline test. Of the oven-dried parts of plants 39 responded "positively" in varying degree to the alkaline test. All of the male plants responded in varying degree both when air-dried and when oven-dried. In no case was capacity to respond to the test impaired by the heat treatment. The oven-dried parts of plants, on the contrary, gave stronger tests than the air-dried parts. Those which are shown in the table as "positive trace" have been referred to in other sections of this report as "negative" plants. The reason for our designating those very slight traces as "positive" in this phase of the investigation is based upon the fact that we were here looking for tendencies which a process of drying might have upon increasing or decreasing the reactivity of the plant. In the estimation of this laboratory such slight traces would not be sufficient justification for embarking upon criminological procedure and court action. However, for the purpose of scientific investiga-

tion they must needs be taken into account. These small traces fall within the category of bare indications of a "positive" Beam test.

RESPONSE OF 13- AND 14-WEEK OLD PLANTS TO ALKALINE BEAM TEST BEFORE AND AFTER HEATING IN A CURRENT OF AIR AT 100° C.

Plant No.	Sex	Time Heated.	Response Before.	Response After.
2	Male	1 hour	"Positive"	"Positive"
4	Male	1 hour	"Positive"	"Positive"
11*a*	Male	1 hour	"Positive"	"Positive"
12*a*	Female	1 hour	"Positive"	"Positive"
13*a*	Female	1 hour	"Positive"	"Positive"
14*a*	Female	1 hour	"Positive"	"Positive"
15*a*	Female	1 hour	"Positive"	"Positive"
1	Unknown	1 hour	"Positive"	"Positive"
3	Unknown	1 hour	"Positive"	"Positive"
5	Unknown	1 hour	"Positive"	"Positive"
12	Male	2 hours	"Positive"	"Positive"
14	Male	2 hours	"Positive" trace	"Positive"
1*a*	Male	2 hours	"Positive"	"Positive"
2*a*	Female	2 hours	"Positive" trace	"Positive"
3*a*	Female	2 hours	"Positive" trace	"Positive"
4*a*	Female	2 hours	"Positive" trace	"Positive"
5*a*	Female	2 hours	"Positive"	"Positive"
11	Unknown	2 hours	"Positive" trace	"Positive"
13	Unknown	2 hours	"Positive"	"Positive"
15	Unknown	2 hours	"Positive" trace	"Positive"
16	Male	3 hours	"Positive"	"Positive"
17	Male	3 hours	"Positive"	"Positive"
20	Male	3 hours	"Positive"	"Positive"
19*a*	Male	3 hours	"Positive" trace	"Positive"
16*a*	Female	3 hours	"Positive" trace	"Positive"
17*a*	Female	3 hours	"Negative"	"Positive"
18*a*	Female	3 hours	"Negative"	"Positive"
18	Unknown	3 hours	"Negative"	"Negative"
19	Unknown	3 hours	"Positive"	"Positive"
21	Unknown	3 hours	"Negative"	"Negative"
20*a*	Unknown	3 hours	"Negative"	"Positive"
7*a*	Male	4 hours	"Positive" trace	"Positive"
9*a*	Male	4 hours	"Positive"	"Positive"
6*a*	Female	4 hours	"Positive" trace	"Positive"
8*a*	Female	4 hours	"Negative"	"Positive"
10*a*	Female	4 hours	"Negative"	"Positive"
10	Male	5 hours	"Positive"	"Positive"
6	Unknown	5 hours	"Positive"	"Positive"
7	Unknown	5 hours	"Positive"	"Positive"
8	Unknown	5 hours	"Positive"	"Positive"
9	Unknown	5 hours	"Positive"	"Positive"

Two samples of decolorized resin, produced in the course of analysis, were divided and a portion of each heated four hours at 100° C. in a current of air at the same temperature. Response to the Beam tests was not affected. Both samples reacted "positive" to the alkaline test both before and after the heat treatment. One reacted slightly to the acid test before and after heating, and the other reacted "negative" before and after heating.

	Alkaline Test.		Acid Test.	
Sample.	Before Heat.	After Heat.	Before Heat.	After Heat.
A	"Positive"	"Positive"	Slightly "Positive"	Slightly "Positive"
B	"Positive"	"Positive"	"Negative"	"Negative"

SUMMARY.

A survey based upon observation of the growth of three thousand plants of Cannabis sativa in one area has been completed. From this survey the following major conclusions may be drawn:

1. That the alkaline Beam test, as employed and elsewhere described in this report, only gave a "positive" reaction on two-thirds of the plants.
2. That the proportion of male plants reacting "positive" to the alkaline Beam test is the same as the proportion of female plants.
3. That at no time during the growth of the plant was "positive" alkaline or acid Beam test to be obtained from the pith, lower stalk or roots.
4. That plants as small as three inches above ground have the capacity of giving the alkaline Beam test.
5. That the alkaline Beam test and the acid Beam test may result from more than one compound, or may be affected by the presence of other inhibiting compounds which result in a non-uniformity in the degree to which both tests are obtained.
6. That the dried, old fruits give neither test.
7. That neither the alkaline or acid Beam test, either as hitherto proposed or as developed to date, offer any assurance as means of identification from a criminological viewpoint.

PARA-AMINOBENZENESULFONAMIDE.*

NOTES ON THE COLORIMETRIC ASSAY.

BY ASA N. STEVENS AND EDWARD J. HUGHES.[1]

Marshall, Emerson and Cutting (1) have recently published an excellent method for the determination of para-aminobenzenesulfonamide in urine. This is accomplished by using dimethyl-α-naphthylamine to produce a red color which may be estimated quantitatively in a colorimeter after diazotization with sodium nitrite.

Because of the presence of a reddish color in our available supply of dimethyl-α-naphthylamine, and also in a newly obtained sample of this reagent, we found it impossible to make a satisfactory colorimetric determination until this color had been removed by means of fractional distillation.

It is therefore our custom, in all cases where the dimethyl-α-naphthylamine is not of a clear straw color, to provide freshly distilled reagent as an essential part of the colorimetric procedure.

We have found also that it is exceedingly important to use no more than the prescribed 1 cc. of 0.1 per cent sodium nitrite solution for the diazotization, in order to avoid the development of a brown color which gives low results. Furthermore it has been our experience that although the color produced by para-aminobenzenesulfonamide in pure water is stable for several hours, the color produced in urine reaches its maximum intensity in about five minutes and should be compared with a suitable standard within ten minutes. Longer standing tends to produce an orange color which yields lower results.

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* Scientific Section, A. PH. A., New York meeting, 1937.

[1] Control Laboratories, Eli Lilly and Company.

In the light of these observations, we have undertaken to slightly modify the Marshall, Emerson and Cutting method as follows.

MODIFIED METHOD.

Place approximately 50 cc. of dimethyl-α-naphthylamine in a 100-cc. distilling flask, which is connected to a suitable condenser, and distil at room temperature, retaining the clear straw-colored fraction that distils between 270° C. and 277° C. Dilute 1 cc. of this distillate to 100 cc. with 95 per cent ethyl alcohol.

Prepare standard solutions of para-aminobenzenesulfonamide containing 1.0 mg., 0.5 mg. and 0.2 mg. in each 100 cc.

Prepare also a 0.1 per cent solution of sodium nitrite in distilled water.

To 10 cc. of a 1 to 100 dilution of the sample of urine under examination, contained in a small flask, add 2 cc. of tenth-normal hydrochloric acid, exactly 1 cc. of a freshly prepared 0.1 per cent solution of sodium nitrite, 5 cc. of 95 per cent alcohol, and 1 cc. of the 1 to 100 solution of dimethyl-α-naphthylamine prepared as directed above. Shake the flask after the addition of each reagent. Ten cc. of each of the standard solutions are similarly treated. Compare the color produced by this solution with those of the standard solutions of para-aminobenzenesulfonamide. From these preliminary observations make a dilution of the sample under examination so that 100 cc. contains from 0.5 mg. to 1.5 mg. of para-aminobenzenesulfonamide.

Then to 10 cc. of this dilution, contained in a small flask, and also to 10 cc. of the standard solution which it most nearly approximates, add 2 cc. of tenth-normal hydrochloric acid, 1 cc. of the freshly prepared solution of 0.1 per cent sodium nitrite, 5 cc. of 95 per cent alcohol and, finally, 1 cc. of the solution of dimethyl-α-naphthylamine prepared as directed. Shake the flasks after the addition of each reagent.

After five minutes, but before ten minutes have elapsed, the solutions are compared in a suitable colorimeter. The results are calculated on the basis of the relative depth of color as indicated below.

$$\frac{\text{Reading of standard} \times \text{concentration of standard} \times 10}{\text{Reading of unknown} \times \text{number of cc. of original material}} =$$

Mg. of para-aminobenzenesulfonamide found in 1 cc. of the unknown specimen.

In order to keep the degree of error within narrow limits, the readings of the standard and the unknown solutions should match within 5 mm., or new dilutions should be made.

REFERENCE.

(1) Marshall, E. K., Kendall, E., and Cutting, W. C., *J. Am. Med. Assoc.*, 108, 953 (1937).

CANCER PRODUCERS.

From the bile acids of the body methylcholanthrene can be obtained, one of half a dozen cancer-producing agents. Last year Professor Louis F. Fieser and his Harvard associates not only synthesized methylcholanthrene but twenty-two related cancer producers. Some of the twenty-two are much simpler in chemical structure than methylcholanthrene and nearly as powerful.

THE DUKE HOSPITAL PHARMACY.*

BY I. T. REAMER.[1]

Twelve years ago my drug store employer made this remark when I left his employ for a hospital position: "The Hospital Pharmacist is a mere figurehead. He buys everything prepared and merely fills the small bottles from the large ones." This statement is not true, but I do believe it true that the general impression of Hospital Pharmacy twelve years ago was as he described it. The importance and prestige of the Hospital Pharmacy is on the upward curve. Let all of us who are associated with it continue to build upward from the solid foundation which is being constructed at the present time.

Six years ago I was employed to organize the Duke Hospital Pharmacy. At that time the city in which we are located had two other hospitals and neither hospital had a pharmacist. Nurses were doing the pharmaceutical work which should have been under the supervision of a pharmacist. The larger of the other two hospitals installed a pharmacy four years ago and readily saw the benefits of such a move. Recently I investigated the conditions of the drug room of the other hospital and as a result this hospital will employ a pharmacist for work beginning the first of the coming month. My belief is that quite a few of the smaller hospitals should be encouraged to employ registered druggists to take care of the drug supplies. At the present time there is a shortage of nurses throughout the nation. This is a grand opportunity to relieve nurses of their drug duties and turn the work over to persons who are better qualified to do it. If these positions are filled by well-trained men and women, the respect for pharmacy, will be increased. The backbone of ethical pharmacy responsibility lies with the hospital pharmacist to-day and we should take advantage of our present opportunity.

When our pharmacy was opened at Duke, service and courtesy became the watch-word of our department. Every opportunity to give information to doctors and nurses was taken advantage of and a complete reference file and catalog list was the first step toward this achievement. Mimeographed forms were distributed showing the lists of the expensive medications and the inexpensive ones. The comparative cost of all the vitamin preparations and the forms in which they were available were listed for their information. We published a Hospital Formulary which made quite an impression on our staff. It enabled them to prescribe medications of hospital formulas by the formulary names rather than to write out the complete list of ingredients for each prescription. The use of U. S. P. and N. F. preparations was encouraged and very few proprietary medications were dispensed.

Most of the hospital pharmacies use the tray system and each morning, except Sunday, bottles are returned to the pharmacy for refilling. This consumes quite a bit of time and in order to speed up this service, the Exchange Shelf system was adopted. On the pharmacy shelves we have filled bottles of all ordinary medications such as mineral oil, mouth wash, talcum, glycerin, etc., for each ward, and in the morning rush period the trays can be made ready for return to the ward in a remarkably short period of time with the use of the exchange system.

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* Section on Hospital Pharmacy, A. PH. A., New York meeting, 1937.

[1] Duke Hospital, Durham, N. C.

The metric system is in use at our hospital. It is much simpler and is much more economical than other systems. I had worked with the apothecary system for several years and was familiar with the waste which accompanied the use of this system. For instance, one or two bottles of sodium, potassium and triple bromide would be stocked on each ward in strengths such as 5, 10, 15, 20 and 30 grains per drachm. With this method, the 15 to 30 bottles necessary for these three drugs alone would almost jam the medicine cabinet. With the use of the metric system, three bottles took the place of 15 to 30. We stocked one bottle of 10% solution of sodium, potassium and triple bromide and the label stated that one cc. = 0.1 Gm. With the label so marked it was very convenient to dispense any dose of bromide medication that would be ordered. When 0.3 Gm. was wanted, 3 cc. were measured and if 0.6 Gm., 6 cc., etc., so that it was very easy to dispense the medication properly with three bottles instead of a possible 15 to 30.

Everything possible is done to protect the medications and in doing so protect the patient against the use of deteriorated drugs. A very spacious ice-box is used for stocking all sera and antitoxin, suppositories, etc. I know from observation that this is neglected in quite a few institutions. All of our eye medications are labeled with an expiration date label as well as such solutions of silver salts or tannic acid which deteriorate on standing. Labels on all bottles are either printed stock labels or typewritten ones and then are coated with collodion and shellac. This saves label changing and makes them easy to read for a long period of time.

Economy is practiced wherever possible, but not by the use of cheap drugs and chemicals. Only the best quality of material is used and everything is purchased from reliable manufacturers. The cheap prices offered as bait by disreputable firms are ignored. We buy in bulk whenever possible, because this has proved to be one of the best ways to save. When new preparations are wanted, we buy just enough for our immediate needs. Our observation is that prices fluctuate very quickly on the newer popular medications. The vitamins are a good example of changing price. Every two or three months there is some revision made. The new drugs, mandelic acid and sulfanilamide, have dropped in price almost every week and the present price is practically 50% less than the prices paid three months ago. The same situation prevailed with amino-acetic acid. It was $15.00 per pound less than eighteen months ago and it now can be purchased for $3.00 per pound. The drug markets must be followed closely from week to week in the leading journals to keep in touch with the various changes made. Perhaps the largest saving we make is accomplished by our manufacturing a number of pharmaceutical preparations. Milk of magnesia, mouth wash, tincture of iodine, salt solution for compresses, intravenous solutions of dextrose and saline, lubricating jelly, ointments, emulsions, all preparations containing alcohol, etc., save us thousands of dollars each year. With proper mechanical apparatus all of these items may be prepared and be of the best quality. A very good quality of blue-black ink may be made for approximately twenty-five cents per gallon, and our institution uses nearly five gallons per month.

The days of mortar and pestle mixing have passed for quantity and quality manufacturing. Colloid mills for mixing emulsions and lotions, motor-driven ointment equipment and a ball mill for powder mixing are considered essential to-day in hospital pharmacy.

The use of colored solutions in hospital dispensing is also increasing so that certain widely used preparations will be easily recognized. We color our mouth wash with a red coloring, our alcohol with fluorescein to give it a green tint. Colored capsules have also found their place in modern pharmacy. We manufacture thousands of capsules of codeine, caffeine, aspirin; and codeine, caffeine, aspirin with atropine for our student health division which serves 3300 students. The capsules which contain atropine are colored with charcoal to give them a distinctive appearance. Another special formula we color with carmine to make it easily recognizable.

Our hospital is very closely allied with the Duke Medical School, and it is our good fortune to know the teaching staff of this organization. All the chemicals which are used in the medical school are purchased by our pharmacy and this contact helps us a great deal. The research problems that are under way are discussed with us when materials are purchased to carry out these projects. This knowledge gives us a keener insight into the medical problems and enables us to keep step with the advancement of medical knowledge.

Clinic patients who visit our Public Dispensary travel an average distance of 75 miles each. There are from 150 to 300 such patients daily except Saturday and Sunday. Any patient who has visited the clinic may have his prescription filled in our pharmacy. These people are treated in the same way as a person is treated who visits an ethical retail drug store. Individual attention is paid to them, and any suggestions that we can make regarding storage, proper method of taking, length of time before consumption, etc., is given them.

Another phase of our work is to teach our senior medical students practical pharmacy and prescription writing. A demonstration of the routine procedure of pharmaceutical manufacturing of the different types of preparation is given. All the drugs that are taught in lectures on prescription writing are shown to the group when the drug is discussed and a prescription for each of them is written by every member of the group. Weights and measures and incompatibilities are covered thoroughly.

We try to do a good job of promoting pharmacy interests. Our men work a 45-hour week, receive fair salaries, get a vacation of from two to four weeks and have every Saturday afternoon and all day Sunday off duty. All of our pharmacists live in the hospital and get to know the doctors personally. We never hesitate to question a physician about the medication that he prescribes and they appreciate all that we can do for them to increase their knowledge of the use of drugs. This coöperative spirit makes our work easier and never do we find pharmacy in our hospital anything other than a very interesting profession.

SOLUTION OF FERRIC CHLORIDE EASILY PREPARED.*

BY C. O. LEE,[1] F. J. LEBLANC[2] AND H. BANG.[3]

It would be interesting to know how many teachers of pharmacy require the preparation of the official ferric chloride solution as a regular laboratory assign-

* Section on Practical Pharmacy and Dispensing, A. PH. A., New York meeting, 1937.

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[2] Assistant Professor of Pharmacy, South Dakota State College, Brookings, S. D.

[3] Assistant Professor of Pharmacy, State College School of Pharmacy, Pullman, Wash.

ment. It would be also just as interesting to know how many of us have had sufficient experience with it to have abandoned it except as a special problem for the more advanced and experienced students.

We, at Purdue, have found the manufacture of this preparation so troublesome that it seems to us to be an impracticable assignment for beginning students.

The fact that it is a tedious preparation to make constitutes a challenge. The simplified procedure for making it, which is given here, is not a new one. It consists of oxidizing ferrous chloride with hydrogen peroxide. The formula and procedure are as follows.

SOLUTION OF FERRIC CHLORIDE

Solution of Ferrous Chloride.....100 Gm.
Hydrogen Peroxide.....125 Gm.
(Not less than 3 per cent strength)

To make.....**100 Gm.**

Procedure: Weigh 100 Gm. of the solution of ferrous chloride in a suitable, tared dish. Add the hydrogen peroxide from a burette slowly and with gentle stirring. Place on a water-bath and concentrate to 100 Gm.

The solution of ferrous chloride is prepared by the procedure given in the U. S. P. IX for the ferric chloride solution. If this is done with care and carefully oxidized, according to the procedure just outlined, a product of U. S. P. quality will be the result.

In this work we have taken the pains to assay the hydrogen peroxide which was used. An amount somewhat in excess of the theoretical requirement for complete oxidation of the iron solution seems advisable. However, there appears to be no advantage in adding large amounts in excess if the procedure is carefully followed.

It might be well at times to assay the ferrous solution if there is any reason for believing it to be below the required strength. The reason for the suggestion is obvious.

Six ferric chloride solutions, one by the U. S. P. IX formula and procedure, and five by the method under discussion, have been assayed. The results are tabulated as follows:

	Per Cent Ferric Iron.	
Sample.	Peroxide Method.	U. S. P. IX.
1	10.2%	.....
2	10.3%	.....
3	10.6%	.....
4	10.5%	.....
5	10.5%	.....
6	....	11.07%

The procedure for these assays is that of the U. S. P. XI. We feel that enough has been done with this formula and procedure to recommend it. The assays have been consistent and up to the official requirement.

It has been observed that it is possible in some cases to get tests for ferrous iron in the ferric solutions made by both the old and new procedures. However, the percentage found to be present seems to be negligible and in some cases not present.

In addition to the use of hydrogen peroxide 3 per cent as the oxidizing agent, a solution of 30 per cent strength was also used. This solution of high concentration caused such a violent reaction that it had to be added very carefully and slowly. About 15 ml. of the stronger solution oxidized 100 Gm. of the ferrous chloride solution. This reduced the amount of evaporation necessary to make the finished product weigh 100 Gm. However, we feel that the 3 per cent hydrogen peroxide is the one to be preferred in making this preparation.

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GRAPEFRUIT, CITRUS GRANDUS, C. DECUMANA AND RELATED SPECIES AS A PHARMACEUTICAL FLAVORING AGENT AND VEHICLE.*

BY DAVID J. MASON.[1]

PART I.

The present trend in pharmaceutical vehicles is toward the natural fruit flavors. The recently popularized SYRUP OF CHERRY N. F. VI is an indication of how readily our medical colleagues will seize an opportunity to minimize the patient's resistance to unpleasant tasting medication. While there is no lack of flavoring vehicles to mask harsh-tasting active principles, we must admit that the superiority of one vehicle over another varies with the drug under consideration and the individual's taste. Hence, any increase in the physician's repertoire of pharmaceutical flavoring vehicles should yield a proportionate increase in the number of nasty tasting medications that can be "brought under control." Because of the abundant national supply, its relative lower cost and its pleasant-tasting constituents and aroma, the author sees in the grapefruit, a potentially new pharmaceutical vehicle.

A search of the pharmaceutical literature reveals that no work has been done upon grapefruit as a flavoring vehicle and because of some pleasant experience the author has had with this flavor he thinks it is advisable to further investigate this matter. To present the subject properly the author plans to cover its various aspects in a series of papers. This paper, the first of a series, will concern itself with the bibliography, a description of the chemical and physical properties of the grapefruit constituents, and the botanical classification.

The grapefruit is variously known as the Pomelo or Shaddock, so called from Captain Shaddock who first brought the fruit from the East Indies. The name Shaddock generally applies to the pear-shaped varieties and the Grapefruit or Pomelo to the round ones.

* Section on Practical Pharmacy and Dispensing, A. PH. A., New York meeting, 1937.

[1] Member of the Professional Relations Committees, New York Pharmaceutical Council.

Grapefruit is grown mainly in Florida and the desert districts of California, Arizona and Texas. The botanical name of the Florida variety is *Citrus Decumana*. The horticultural race is usually divided into the Pomelo and the Shaddock. The horticultural varieties of the former commercially grown in Florida are Silver Cluster, Triumph, Duncan, Marsh Seedless, Hall and several others. The California and nearby production of grapefruit is largely the Marsh Seedless variety, or *Citrus Grandis* (L) Osbeck. There is also the seeded variety known as Clayson Grapefruit and others, the former, however, is the most important commercially.

Since the United States produces (1934) about 90% of the world's supply of grapefruit, it may be considered essentially as an American industry. Approximately 100,000 tons are processed annually by the Florida canners alone.

A cursory description of the gross anatomy of the grapefruit is helpful. The outer yellowish portion of the rind is called the flavedo. It contains the yellow coloring matter and the oil cells containing the volatile oil. Immediately below this is the white portion of the rind and it is known as the albedo. This contains the bitter glucosidic principle naringin, characteristic of the grapefruit. The remaining inner rind and the cellulose-like, nitrogen-containing membranes which are left after the juice is expressed is known as the rag. It is considered a waste product and is generally used as a cattle feed (24). It has potential use as a raw material source for narangin and pectin (1).

The volatile oil may be obtained in three ways. First, by expression from the whole fruit and by subsequent centrifuging from the combined juices (Pipkin process) (2). Second, by the knife process wherein the peel is cut away by sharp knives and then expressed. The third and most commonly used method is known as the hot peel method. Here the fruit is passed through water at 93–100° C., until the skin puffs (3–5 minutes) and is easily removed, thus resulting in a warm peel for the oil expression apparatus.

Grapefruit oil is a pleasant smelling amber-colored liquid resembling somewhat orange and lemon oils. On standing or chilling a yellowish brown, flocculent precipitate forms, which may entirely disappear on warming. Its refractive index is

$$\frac{d20}{20}\ 0.8563,\ [a]\ \frac{20}{D} + 93.28°,\ \frac{n20}{D}\ 1.4758$$

An analysis of the Florida grapefruit oil by Nelson and Mattern (1) reveals the following proximate composition:

Limonene	90.0%
Waxy materials (non-volatile)	7.5%
Oxygenated volatile constituents and sesquiterpenes	2–3%

These consist of octyl and decyl aldehydes; octylic and decylic acids, probably present as esters; geraneol and octyl alcohol (both free and as acetates); cadinene; also probably a very small quantity of *n*-nonyl alcohol; and methyl anthranilate and citral in small quantities. Pinene, terpineol and decyl alcohol were not found. They find no marked difference between oils prepared by the cold or hot peel methods. They also describe a method and suitable apparatus for preparing a terpeneless oil with a yield of 2.7%. The turpentine taste caused by the oxidation of the limonene is eliminated and a concentration ratio of 37 to 1 is obtained.

The relatively high percentage of aldehydes in grapefruit oil indicates the necessity of protecting the oil from oxidation. It is best kept in small amber-glass bottles well filled, and securely stoppered. On the assumption that the hot peel expression method would include a greater percentage of undesirable nonvolatile matter (waxes, etc.), the author recommends for the present only the cold pressed oil for pharmaceutical compounding.

The albedo of the grapefruit contains the glucoside naringen ($C_{27}H_{32}O_{14}.2H_2O$) and was first discovered by De Vry (3). It is a crystalline lemon-yellow substance,

intensely bitter (4), (5) and can be detected in dilutions of 1 in 10–50,000 parts of water. It is soluble in alcohol, acetone and water. When crystallized from these solvents and dried at 110° C. it melts at 171° C. but when crystallized from water it takes on an additional six molecules of water and the melting point is lowered to 83° C. At 45° C. naringin is practically insoluble in water but as the temperature is raised to the melting point (83° C.) its solubility rapidly increases.

Low temperatures will often cause precipitation of the glucoside in canned juices and fruits, especially if prepared from immature or frozen fruit. This precipitate generally settles to the bottom as a yellowish white sludge. Also sections of the fruit may show light yellow spots resembling molds or the juice may have a milky appearance. This is due to the crystallization of the naringin (4). As the fruit matures the naringin content diminishes (11). For this reason well-ripened fruit is most desirable for pharmaceutical compounding.

Upon hydrolysis with dilute acids, the glucoside yields glucose, rhamnose and naringin. The latter, when boiled with KOH, yields phloroglucin and *p*-coumaric acid. This reaction is used advantageously in treating grapefruit sections before canning to remove bitterness and to soften the section membranes (7).

Pectin is also present in grapefruit residue as calcium pectinate (3–4.5%, see Table I) and is a valuable constituent of jellies and marmalades. Medicinally pectin is used as a hemostatic (6), as a detoxicant (25), and in infantile diarrheas (26). Pharmaceutically it has possibilities as a disintegrant in tablet manufacture (27). The grade of pectin is expressed as the number of parts by weight of sugar that can be made into a good jelly with one part by weight of pectin. The 160-grade pectin was considered standard. The 100-grade, however, has become the most popular commercially. Poore describes (5) an effective method for extracting this pectin.

An analysis of California Marsh Seedless grapefruit juice removed by burring contained 12.1% solids, according to the Brix Hydrometer, and 1.87% of acid giving a ratio of solids to acid content of 6.47 to 1. The following organic acids are present in the fruit and juice (22):

Citric	0.6700	to	1.5810%
Tartaric	0.0003	to	0.0007%
Malic	0.0069	to	0.0163%
Oxalic	0.0022	to	0.0053%

An excellent paper describing the constituents of American grapefruit has been written by Zoller (17).

Various methods have been proposed for testing grapefruit maturity (8), (29). It is the practice to express the ratio of the total soluble solids existing naturally in the juice to the per cent of anhydrous citric acid present. The juice is screened (20–40 mesh) and deærated to avoid incorrect readings (Brix Hydrometer). The exterior color (flavedo) may be expressed as a per cent of the ultimate color of the mature fruit characteristic of the horticultural variety. The maturity standards law specifies, however, that this form of testing may be used only at the time of picking.

TABLE I.—PER CENT ANALYSIS OF CALIFORNIA GRAPEFRUIT PEEL AND RAG COMBINED.

Total solids, vacum at 70° C.	22.02	Crude fiber	2.00
Ash	0.70	Protein (N × 6.25)	1.63
Acid as citric	0.43	Total sugars as invert	8.68
Volatile oil (steam dist.)	0.56	Pentosans	1.31
Ether extract	0.23	Calcium pectate	3.93
		Naringin	0.63

before bronzing has set in, either on the tree or in the packing house. This method probably cannot be relied upon when producers or others resort to artificial coloring with C_2H_4 or other means (21).

For preservation and storage, glass has no particular advantage over tin. The cold pack (cans packed as usual and filled with syrup at 180° F. to produce a partial vacuum, sealed and immediately frozen solid) has been found to best maintain the aroma, taste and freshness of the fruit. The difficulty of maintaining this frozen state continuously during distribution and consumer storage, makes this impractical.

The good preservation of the vitamin C content of grapefruit packed in tin cans may be attributed to the disappearance of oxygen from sealed cans after a few days' storage. The slow evolution of hydrogen from the reaction of the acid upon the metal produces a reducing medium for the storage of the fruit (10).

As a rule grapefruit juice is preserved by pasteurization at 185° F. for 6 seconds and then immediately packed (9). There are firms that produce juice concentrates of about 8–1. They use as preservatives $^1/_{10}$ of 1% sodium benzoate domestically and SO_2 for export. If the juice is properly pasteurized and sealed no preservative is necessary until opened. Likewise if sterile juices are sufficiently concentrated they will not ferment until they become subsequently contaminated and, fermentation even then, proceeds very slowly unless diluted.

Cold storage effectively prevents the deterioration of the fruit but eventually results in the breaking down or pitting of the peel. Below 40° F. flavor improves, the fruit becomes sweeter, and the acid content lower. Bitterness decreases on storage, owing apparently to the breakdown of the naringin (11).

The effects of arsenical spraying of grapefruit trees are interesting (23). In all cases where arsenical spraying has been resorted to, arsenic has been found in the rind, rag and juice. There is a slight translocation of arsenic by the vascular system of the tree. Although the amount of arsenic present in the juice is negligible from a health viewpoint, it reduces acidity from 5–20%, decreases the soluble solids and in some cases, greatly hastens maturation. This enables growers to evade the green fruit laws and fulfils maturation standards of acid to sugar ratio. Fruits so matured are of an inferior nature, lack juice and acidity and are insipid. Many states now prohibit the use of arsenical sprays by denying registration of such insecticides.

High temperature treatment of fruit juices yield an objectionable or at best a "cooked" flavor. In extracting the juice, heavy or excessive grinding or screening should be avoided to prevent the incorporation of peel oil or bitter substance from the peel, rag or seeds. A preliminary washing of the chilled fruit in a dilute solution of Ca or Na hypochlorite (50 p. p. m. of Cl) is desirable. A clear product which retains its characteristic flavor for several months may be prepared as follows (12). The grapefruit is washed, expressed and pasteurized at no higher than 85° F. and then stored at 40–50° F. until a sediment is deposited. The clear supernatant liquid is then mixed with kieselguhr and filtered through a pressure filter, sweetened (to contain 17–20% solids—cane or invert sugar) and blended to taste, again pasteurized and run into sterile containers. It is the practice to add dry sucrose or dextrose to increase the Brix acid ratio to 10–13:1. Such addition must be stated upon the label, however, to conform with Federal Law.

Reaming and sweetening incorporate air into the juice. Heating this juice to remove the air lowers the vitamin C content and damages the flavor and keeping quality. The air is best removed by agitation and vacuum deæration at a vacuum of 27 inches or more.

Amber or dark green bottles are used to mask the separation of solids. Stippled bottles are most satisfactory. Grapefruit juice will darken during storage in glass containers. This can be prevented by deæration and storage at low temperatures (60° F. or less). Storage at below 40° F. has delayed darkening for four years. As yet, no process has been developed which will yield juices exactly similar to the fresh fruit in "bouquet" and aroma. The juice for pharmaceutical compounding is best prepared from the fresh mature fruit or a well-processed concentrate purchased in quantities not to exceed a two or three months' supply.

All equipment (9) coming in contact with juice should be of stainless steel or glass. Blocked tin, aluminum and nickel may also be used but are less desirable. The juice should never be permitted to come in contact with iron, zinc, copper or high copper alloys. These metals injure the flavor, food value and keeping qualities. All equipment should be thoroughly washed and steamed immediately after use and twice daily if operations are continuous.

The bibliography of the Genus Citrus is quite large (13). Of late much has been written on its vitamin content. The vitamin C potency has no direct relationship with the soluble solids, acid content or p_H and does not alter after two months' storage under ordinary conditions (14). Preventative experiments show that the antiscorbutic potency is equal to that of the lemon. Curative tests indicate that it is even stronger (15). The frozen juice has the same antiscorbutic potency as the fresh fruit as indicated by tests on guinea pigs (16). A water-soluble vitamin B has been found in quantity equal in potency to an equal volume of cows' milk. Suitable methods of desiccation does not destroy this potency (18). Morgan and Chaney report a slight amount of vitamin A and B. They claim that considerably more of these vitamins are present in home-made jellies and marmalades than in the commercial varieties which suggests a partial vitamin destruction during processing (19). Vitamin G is also present in small amounts (20). A substance exerting a powerful influence on capillary permeability has recently been isolated. Szent-Gyorgyi and his associates have named this factor vitamin P (28).

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WORKING CONDITIONS IN RETAIL PHARMACY.*

BY WORTLEY F. RUDD.

It is common knowledge that by and large they are frequently intolerable. The subject has been talked to death for generations but to date little has been done to correct much of the evil in them.

If you had for a generation or two sat in a pharmacy dean's office and watched enthusiastic, rosy cheek, ambitious fellows as they graduate, pass the board and go into retail pharmacy, and had made yourself sufficiently interested in their affairs so that they come back to visit and talk things over with you from time to time, you would know what is much on my mind in this connection. Even at the end of the first year their step is a bit slower, some of the color has gone and with it some of their enthusiasm. On their second and third and subsequent visits these changes are more pronounced, and we see these men showing signs of settling down in the company of thousands of cadaverous, complaining, non-coöperative and critical men that fret out their very souls as clerks and proprietors in drug stores all over the nation.

I should preface what I am going to say by stating that I do not belong to that group that believes there is anything whatever inherent in the retail drug business, as such, that justifies in any sense many of the working conditions that do exist. But generally speaking, many of them are bad and somebody somewhere, and at sometime, must make a beginning in a study of the causes that have brought about these conditions and offer practical suggestions for changes.

Certainly the writer has no thought that he is a pioneer in this field. You and I have heard long and earnest disquisitions on the subject and have gone home and

* Read before the Section on Education and Legislation, A. PH. A., New York meeting, 1937.

done nothing about it. The reminder comes so often, however, as we visit among the stores and talk with our friends about it, that we are constrained to present the whole matter again to some organized group that might be able to do something to help this large group of public health servants.

At the beginning of the present century pharmaceutical education and pharmaceutical legislation occupied the center of the stage whenever pharmacists gathered in convention. Something was done and done vigorously about both of these, and the results are known everywhere. Only four states, I believe, are left that do not now require all who become registered pharmacists to be college graduates, and in just two years more the minimum training of those who may ask to be examined for registered pharmacist's license will be the bachelor of science degree awarded only after four years of college work, and yet we still send our graduates out to working conditions that in many instances are little less than barbarous and do nothing to remedy them.

I am going to be bold enough to assume the rôle of prophet in this connection. In those states where there is a fair balance between the demand and supply of registered pharmacists as regulated by the output of the colleges from year to year, the number of drug stores will remain more or less stationary for a few years. After that, drug stores per population should and most probably will decrease, offering one hope as we see it of a natural surcease from the tragic cut-throat policies that are so prevalent to-day. In the meantime, hours of work by both proprietors and clerks in such states will almost certainly be curtailed. However "service-minded" the young men and women who go into pharmacy will be, they are not likely to submit to the gruelling requirements of the 8:00 A.M. to 10:00 or 11:00 P.M. shifts operating in many stores at the present time and which, in nearly every instance, bear no relation whatever to the actual needs of the community either for health service or to the economic safety of the business involved.

Are we who assume the rôle of leadership in educational matters willing to stand by and see all the good we do by bringing into pharmacy well-trained enthusiastic men and women largely nullified because nobody has the courage to lead a militant crusade for the adoption of working conditions that at least admit of some of the ordinary recreation and family, social and community obligations that men and women must assume if they are in a real sense to be worth-while citizens of the community in which they live and rear their families?

Optimists are rather rare among men and women who have worked under such conditions over a considerable period of years. It has taken a toll of nervous energy, sense of humor, enthusiasm and hopefulness that often leaves the victims stranded and all to no good purpose, as every one here will freely though regretfully admit.

The problem immediately before American Retail Pharmacy is what is to be done to improve these conditions. That there are too many stores has been said so frequently that to repeat it here is indeed trite, but it must be said and said again until something is done about it. That the hours are too long is an equally hackneyed subject. It, too, must be discussed fully and frankly until somebody does something to improve them. Now by whom, and where, and how are these changes to be brought about?

Discussing first the number of stores. There is probably not a man in retail pharmacy in America who down in his heart believes that except in new territory,

health considerations—the only raison d'etre for them at all—will demand that another pharmacy be opened in this country while you and I live. Of course there are pressure groups who care not a tinker's damn for anything except more avenues for the distribution of their products, and who are therefore willing to sponsor new stores where they are not needed and even at considerable economic risk. But in the last analysis they have not the slightest interest in the health-service features of the profession and thus constitute a distinct menace to the improvement of American Pharmacy.

Here we should consider well who constitutes these pressure groups, as often they are "Wolves in sheep's clothing," and so well disguised that the most intelligent are sometimes fooled by them. Wholesalers and manufacturers may belong to pressure groups, and how often do we find that health service considerations have little place in their programs. In fact, trained pharmacists are relatively few in number in many such organizations. This condition should have due consideration by the Section on Education and Legislation.

Indirectly, colleges of pharmacy in instances contribute to the opening of far more pharmacies than the public welfare demands. It is hardly necessary to say to you that in any state where there are more colleges of pharmacy than are needed, the supply of registered pharmacists and therefore potential proprietors will inevitably increase store competition and degrade working conditions. Thus, the colleges whose sole function should be to elevate pharmacy, sometime belong to the most reprehensible group and become responsible for much of the evil we see in it to-day.

Who will have the courage to face this issue squarely and persist in the fight to cut down the enrollment of competitive institutions to a point limited only by the public's need for men, and not by the need of the colleges for students? This is a serious problem and must be met. We believe such a campaign may result in the elimination of some of our schools of pharmacy. If the public good is at stake they should be eliminated, and peace to their ashes!

What a difference it would make, if, beginning now, the manufacture, jobbing and retail distribution of all drug products were entirely in the hands of graduate registered pharmacists. What do you think would be the effect upon the pharmacies of the country in the next few years if this were true? And that a great many of these functions are in the hands of mere tradesmen constitutes a great menace to pharmacy which most pharmaceutical groups hesitate to talk about too freely or too loud for fear of its effect upon the volume of distribution of much, perhaps, that should not be distributed anyway. But somebody should say, and continue to say that eventually trained pharmacists and they alone should manufacture and distribute products that constitute the armamentarium in all fights against disease. Perhaps the place to initiate this movement is in the Section on Education and Legislation. I therefore wish to offer the following resolution to be discussed here, and then sent to the Resolutions Committee of the House of Delegates:

WHEREAS, the manufacture, jobbing and retail distribution of all drug products is closely related to the prevention, relief and cure of disease, and as such is fundamentally a public health service,

Therefore be it resolved, by the Section on Education and Legislation that we go on record as favoring the general plan of having all functions as listed above in the hands of registered phar-

macists only, just as rapidly as this can be brought about without disrupting the industry. Further,

Be it resolved, that we favor legislation similar to that already enacted in Maryland and Virginia requiring that the manufacture and packaging of drugs, medicines, toilet articles, dentifrices and cosmetics be under the immediate supervision of a registered pharmacist or some other person approved by the Board of Pharmacy. And further,

Be it resolved, that the labels of all drug products of all kinds carry the statement that their manufacture be done under the supervision of such registered pharmacist or other qualified person.

The first two of these will, of course, require legislation to make them operative. The second objective, however, it seems to us may be brought about by the moral suasion implied by the passage of similar resolutions by all of the health service pharmaceutical organizations of the country.

What shall we say about working conditions in many stores? That some of these are intolerable, unnecessary, uneconomic and often even dangerous to public health, will hardly be questioned. They are a cancer eating at the very vitals of one of the most necessary parts of the whole health program, and yet we do little to remedy them. I am unqualifiedly opposed to the unionization of professionally trained men for the accomplishment of changes in conditions such as the ones referred to above. Pharmacy degrades itself when it must resort to such methods of improvement, but unless improvement does come, just as surely as the sun shines we will be confronted by a problem that may even smother what public health consciousness has developed in the profession by demanding higher educational and personal qualifications of its entrants.

With this in mind, I wish to offer for your consideration a third resolution to be passed on to the Resolutions Committee of the House of Delegates:

WHEREAS, many of the demands made upon the time, energy, health, patience and family welfare of those responsible for the health service work of pharmacy as now conducted in a great many pharmacies bears little relation to the obligations of the profession to the public, or to the economic safety of the business, and

WHEREAS, we view with alarm the resentment there is now or may grow up against unreasonable working conditions in the profession,

Therefore be it resolved, that the Section on Education and Legislation recommend to the House of Delegates and through it to the state associations affiliated with it, that this subject have a prominent place on the programs of them all at their next annual meetings.

THE NUMBER OF GRADUATES AND REGISTERED PHARMACISTS NECESSARY TO MAINTAIN THE PROFESSIONAL PERSONNEL AT THE PROPER LEVEL.*

BY E. F. KELLY.

The invitation of the secretary of the Section to prepare this paper was accepted not because it was thought that the question involved could be solved at this time, but in the hope that something might be contributed toward its eventual solution.

An adequate personnel, neither too small nor too large, is a necessary feature of any service and especially so of a health profession. If the personnel is either too small or too large, the service tends to break down on account of lowered standards on the one hand to attract more practitioners and on the other to accommo-

* Section on Education and Legislation, A. PH. A., New York meeting, 1937.

date the surplus. Experience has shown that efforts to control the personnel of a profession should be undertaken very carefully and only after the most studious examination of all the available information. Even if these precautions are taken, it is still held by many to be an un-American procedure since every one should have the right to enter the pursuit of his or her choice. It must be evident, however, that the quality of a health service is of paramount importance to the public welfare and that a reasonable control of the personnel for the purpose of protecting the quality of the service is in the public interest, as well as necessary to the permanency of the service.

The AMERICAN PHARMACEUTICAL ASSOCIATION has for several years past and with the coöperation of its related organizations, particularly the N. A. B. P. and the A. A. C. P., been engaged in an effort to collect such data as will show the extent and character of professional pharmaceutical service in this country and the number of institutions and the personnel required to render this service. Fortunately a number of studies and surveys made by other groups have been very helpful. This effort is far from completion particularly with respect to institutions and personnel. For instance, we have learned this year that 1419 of the registered hospitals employ 1901 pharmacists, but we do not know as yet how many more of the hospitals should employ pharmacists.

Although real progress has been made toward learning the personnel required, there are still a number of basic questions to be determined more accurately. Among them are: (1) what is an adequate pharmaceutical service and what changes will it undergo; (2) do we have too many or too few pharmacies, hospitals, dispensaries, etc., for the purpose; (3) are they properly distributed or are too many located in some areas and too few in others; (4) how much of the time of qualified pharmacists is being given to other than pharmaceutical service; (5) can the service be extended and if so, how? Irrespective of the final answer to these questions which will very likely gradually influence the personnel required, we have to proceed for the present on the basis of existing conditions in any effort to determine the replacement required to maintain an adequate personnel in pharmacy.

The data so far available indicates that there are approximately 100,000 pharmacists registered and in practice in this country; that about 1000 of them die annually; and that their average length of service is about thirty years. If these data are dependable, then from 3 to $3^1/_2$ per cent of the 100,000, or from 3000 to 3500 should be replaced annually. In the Charters Report, issued in 1925, it was estimated that approximately 5000 replacements would be required. In the report of the Committee on the Cost of Medical Care in 1932, the number of registered pharmacists was estimated at 115,000 and there evidently has been a decline in this number. Another interesting fact is that the Census figures indicate that the number of drug stores in proportion to population in 1933 was about the same as that in 1880, or approximately 1 to 2100; and that during the last two years there was a decrease of approximately 2% in the number of stores. It may be that this decrease is the result of the decrease in the number of practicing pharmacists, since it did not occur during the depression.

The number of college graduates does not accurately show the number of newly registered pharmacists since graduation is still not a prerequisite in four states, but it has been an increasingly dependable guide over the last decade. There has been

a large decline in the number of graduates over the decade, no doubt due in part to the successive changes from the two- to the three- and then to the four-year minimum course in pharmacy and in part to the depression. This decline no doubt explains the reduction in the total number of pharmacists—referred to above.

The decline is indicated by the following figures showing the number of graduates for the years given, as taken from a report submitted at the Dallas meeting by Chairman Jordan of the A. A. C. P.: 1931, 2943; 1932, 2751; 1933, 2274; 1934, 2333; 1935, 1295 (due to the change from the three- to the four-year course); 1936, 1572. For 1937, the number will be about 1800. The decline in registration for these years is proportional although not equal to the decline in graduation, as shown by the following approximate figures taken from the report submitted at the same meeting by Secretary Christensen of the N. A. B. P.; 1931, 2528; 1932, 2344; 1933, 1948; 1934, 2164; 1935, 1480; 1936, 1843. The estimate of graduates for the years 1938 was 2252 and for 1939, 2703 based on the number of students enrolled.

The enrollment for the year 1936–1937 indicates an increase of approximately 5% and it is probable that the increase in attendance and therefore in graduation will continue for some time although it is doubtful that it will exceed the peak of about 1929. In 1929, there were approximately 2900 graduates and even in this high year, less than the minimum estimated replacement was provided.

All of these facts and figures mentioned above are national in scope and apparently do not apply equally when broken down by states or regions. As instances, the Board of Pharmacy in Massachusetts estimates the number of unemployed pharmacists in that state as 500 while other states report an actual and pressing shortage of pharmacists; there is evidently an oversupply of colleges in some sections while other larger areas do not have a college.

Based on the data available, it seems evident (1) that the number of graduates over the last decade is not equal to the estimated replacement required and that as the result the number of registered pharmacists has been reduced to an extent which required careful study; (2) that the number of graduates required varies somewhat from the normal in each state and section and that it should be determined with respect to local and not national conditions although the national average should be employed as the basis of comparison; (3) that an average increase in graduation will tend to continue the same conditions of a surplus in some states and a shortage in others; (4) that the number of matriculants accepted by any school should be carefully regulated with regard to the replacement required for the area it serves.

At one time, it was thought that the raising of standards would tend to limit the personnel in the health professions but experience has shown that this is not necessarily the result. It would seem to be necessary, therefore, to actually limit the number of matriculants accepted, if replacement levels are to be maintained.

We now have available in the reports of the A. PH. A., A. A. C. P. and N. A. B. P. data to show (1) the losses to be expected in the number of graduates and of registrants as compared to the number of matriculants and, fortunately, these are given per school and per state since a marked variation per school and per board is apparent; (2) the number of students per store per state; (3) the gains and losses per state through reciprocal registration; (4) the number of students from any state taking the course in pharmacy in the other states; (5) the ratio of stores to population per state; (6) the number of drug stores per state and per county and city of

the state; (7) the approximate number of graduates that go into the various divisions of pharmacy with approximately 80% entering retail pharmacy, 8% in lines allied to pharmacy, 8% outside of pharmacy, 2.5% unemployed and 2% unemployable.

On the basis of the data outlined above, it would seem possible for each state to arrive at a reasonable estimate of the replacement required, if the national average of 3 to $3^1/_2$% is taken as a basis and modified to reflect the local conditions.

It is encouraging to note that without an arbitrary reduction in the number of schools or an arbitrary control of replacement, pharmacy has apparently regulated its personnel on a national basis about as satisfactorily as any other health profession. The indications are that the national average will continue to be reasonably satisfactory since the expected losses will be about balanced by the expected gain in matriculation and in the increased proportion of graduates who pass the boards.

The local situation, however, seems to demand careful, and in some states immediate, attention, particularly where a large shortage or surplus is indicated, and in some states the situation is being worked out very satisfactorily by a coöperative program between the state pharmaceutical association, the school or schools and the board of pharmacy, which is the ideal arrangement. In one state, these three agencies joined in a request to the state legislature that the appropriation to the School of Pharmacy be increased in order that the number of matriculants could be decreased to meet the estimated necessary replacement, and the request was granted, which shows that this difficult problem can be solved, locally as well as nationally.

THE VOICE OF PROFESSIONAL PHARMACY.*

BY MARVIN J. ANDREWS.[1]

The practice of pharmacy is not essentially a commercial institution, characterized by the bargain and barter of the ordinary commercial establishment. On the contrary it is the art of practice of preparing and preserving drugs and of compounding and dispensing medicines according to the prescriptions of physicians. It is as surely a healing agency as the medical profession; supplementing the efforts of the latter in bringing health to the sick and measuring the doctor's success to that end by its own knowledge and skill.

The voice of professional pharmacy may be silent, yet effective, or it may be audible. In either case a professional pharmacy, to be successful, must be conducted by an energetic pharmacist who is professional-minded. His first job is to sell himself, during and after his college training, on the ideals of professional pharmacy, after which his actions and deeds will sell these ideals to members of the other professions and to the general public.

Of the two voices no doubt the silent one, in its way, speaks the loudest. It may speak in the store or again it may speak many miles away. As an illustration let us follow a prescription after it has been compounded and delivered to the door of the patient and allow it to tell you a story. In its silent way it shows, as it is

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* Section on Pharmaceutical Economics, A. PH. A., New York meeting, 1937.

[1] Assistant Professor of Pharmacy, School of Pharmacy, University of Maryland.

unwrapped, whether the pharmacist is careful, neat, economical and educated. An economical pharmacist will not waste paper and twine in wrapping but will use just enough of each to make a neat uniform package. By so doing he will save from 3 to 4 inches of wrapping paper on each 4-fluidounce bottle, which amounts to quite a saving in the course of the year. The story of neatness is told by the way the label or labels, are placed on the container. If the directions, etc., are neatly typed and spaced correctly, without any mistakes, the silent voice says that it was prepared by a careful pharmacist; however, if it is poorly arranged with several typographical errors it says that the pharmacist was careless. Last, but not least, the appearance of the finished product, such as a cracked or perfect emulsion, usually tells whether or not the pharmacist is educated and has utilized his knowledge.

As time goes on the medicine is consumed and at the suggestion of the physician, the container is returned to the pharmacy to be refilled. Before the patient enters the store, he is greeted by the show windows which tell their story. The professional window differs from the commercial window in that it should be neatly arranged to sell the profession of pharmacy and not the entire stock of the store. Likewise, the contents of the window should tell a definite story of one of the departments that will result in the sale of merchandise. The contents of the window should be changed frequently to attract and retain the attention of the general public, or members of other professions. A few thoughts for a professional window, around which a display may be built, are as follows: (1) method of applying cold applications; use ice caps, throat bags, hot water bottles to be filled with ice water, sponges, alcohol, etc.; (2) hospital supplies; (3) first-aid supplies, and (4) prescriptions. By a prescription display, I don't mean to borrow or ransack the attic and basement of the store for a lot of old antique containers and apparatus that are never used unless they are going to be used in contrast with modern equipment. My thoughts are to capitalize on the profession of pharmacy by allowing the windows or show-cases to tell the story of the correct and incorrect methods of preparing a prescription and to show the containers used in dispensing it for the convenience of the patient. This is easily accomplished by using any type of preparation called for on prescriptions. To illustrate, use a class of preparations such as ointments. Contrast the appearance, under a magnifying glass, of a gritty and smooth ointment. If necessary, use sand in petrolatum to make the particles in the gritty ointment stand out. Briefly point out the advantages of a smooth ointment by signs or photographs, then build the remainder of the display with the bases used in preparing ointments and the different type containers used in dispensing them.

As the patient enters the store he should find a well-illuminated, neat and dignified arrangement of show-cases with displays of professional merchandise. As he nears the prescription counter he should be greeted by the silent voice of the pharmacist in the form of a well-groomed person, who by his mere appearance and actions stands out as a professional man.

Time allotted to this paper will not permit me to go into great detail with the remainder, so from this point on it will be necessary to summarize, rather than go into elaborate detail. The majority of my readers will contend that it is impossible to run a strictly ethical pharmacy and still make a living. With this in view, may I suggest that it would be well, if possible to separate the store into two parts,

that is, a section devoted to the soda fountain and the commercial store and another section devoted to the professional side of pharmacy. The professional section should quietly predominate the store. As this paper deals with the voice of professional pharmacy I will not mention the strictly commercial departments.

A professional pharmacy may be divided into many departments among which are (1) the prescription department, (2) biologicals, (3) drug sundries, (4) hospital supplies, (5) physicians' supplies, (6) first-aid supplies, (7) dental supplies, including all kinds of preparations for the teeth, (8) household remedies, (9) baby and invalid supplies, (10) truss and support department, (11) pet and veterinary supplies, and so forth. The displays for each department should sell the respective merchandise to the patients as they bring their prescriptions in to be filled.

It is through the prescription department that contacts are made with the other professions. Likewise, the success of this department is due to the coöperation with the professions that write prescriptions. Therefore, it will be necessary for this department not only to give service but to have equipment and a personnel with ability and knowledge in order to develop and retain the confidence of the other professions and the general public. The prescription department in addition to rendering the usual telephone and delivery service must be equipped to prepare not only the common prescriptions but also the unusual ones. Likewise, it should be the source of information pertaining to drugs for all the members of the other professions. It is not necessary for any one man to even try to carry vast amounts of information in his mind, on the contrary this is very foolish, the important thing is to have sufficient reference books and journals at his command and to know where to find the information requested.

If space permits, a small room should be set aside for the exclusive use of members of the medical, dental and verterinary professions. This room should be furnished with easy chairs, a flat top desk, bookcases, one show-case, several ash receivers, etc. In addition, the room should be indirectly lighted and be well ventilated. There are no doubt many who would like to know the practical advantage of this room. Briefly, the bookcases should contain reference books and journals, which would be read while the doctor is reclining in the easy chairs. The flat top desk would provide stationery, prescription blanks and other writing materials on which the doctor might write his memorandums or prescriptions. Underneath the glass top of the desk would be cards or leaflets of the seasonable prescriptions being sent out by the local or state U. S. P. and N. F. Publicity Committee, etc. The show-case would be used to display prescriptions of interest, such as those appearing under the glass on the desk, etc. In addition, it would be well to have a filing cabinet containing all the literature sent out by the large pharmaceutical and chemical concerns pertaining to any one of the professions.

There are many other items such as prescription containers, methods of detailing other professions, advertising for the general public, displaying merchandise in the various departments, etc., that could be discussed. However, the time allotted me is up so I will close by saying that the Voice of Professional Pharmacy speaks in proportion to the goal the pharmacist sets for himself and that pharmacy offers more professional opportunities than any of the other more specialized fields, as it is necessary for the pharmacist to be well versed in all of the allied professions.

JOHANN BARTHOLOMÄUS TROMMSDORFF.

PHARMACIST, TEACHER, SCIENTIST.*

BY CURT P. WIMMER.

The year 1937 marks the one hundredth anniversary of the death of Johann Bartholomäus Trommsdorff. He was one of a most noted group of German pharmacists—a group known by their extremely conscientious careful work in chemistry and pharmacy. These scientists hold the esteem of the scientific world to-day. Among them, Johann B. Trommsdorff is the most noted and he is sometimes termed the Nestor of German scientific pharmacy. It seems fitting, therefore, that we review his life and his scientific work at this time.

He was born in Erfurt, Germany, in the year of 1770; the son of Dr. William Bernhard Trommsdorff, who was Professor of Medicine in the University of Erfurt and who at the same time owned a pharmacy in this city.

In the house of his father, who was not a pharmacist, but only the owner of a pharmacy—a scientific spirit prevailed and a tendency to regard the pharmacy of the day, then generally practiced as a trade, as a science. His father was very fortunate in securing as assistants, talented young men who were of outstanding genius and who later became heroes in the realm of science. Young Trommsdorff, having been born in this pharmaceutical atmosphere desired, early in life, to devote himself to the art and science of pharmacy.

The early death of his father caused the fourteen-year-old boy to enter the pharmacy of Dr. Sebastian Bucholz in Weimar, Germany. This pharmacy also distinguished itself by the active, scientific spirit which prevailed therein.

This teacher, Sebastian Bucholz, who had been a practicing pharmacist before he devoted himself to the study of medicine, was very much interested in chemistry. Although his extensive practice did not permit him to devote his time to chemistry, he gave his assistants an opportunity for a scientific education by opening to them his exquisite and selected library.

In his establishment, Trommsdorff acquired the reputation of a first-class pharmacist, and recognized the greatest and noblest of purposes of pharmacy, namely, to contribute to the well-being of the community and to assist suffering humanity.

In the year of 1792, he returned to Erfurt to take over the administration of his father's pharmacy. Three years later he was appointed Professor in Physics and Chemistry at the University of Erfurt. This same year he opened his own pharmaceutical institute, which he conducted for a period of thirty-three years with great success and through which he exerted the greatest possible influence upon the elevation of pharmacy to the status of a science. At this time he also published a "Journal of Pharmacy for Physicians and Pharmacists," an "Almanac for Analysts and Apothecaries," a "Review of the Progress in Science, Arts and Manufacture."

The reason for the foundation of his institute was, at first, to provide an opportunity for young men to become scientific pharmacists. Later on he enlarged the scope of his institute to become a sort of preparatory school for young men who desired to devote themselves to the study of medicine, the various arts and sciences and even business. There were no polytechnic schools in those days and even at the university very little time was given over to the study of science, especially the study of chemistry, which was completely neglected.

* Section on Historical Pharmacy, A. PH. A., New York meeting, 1937.

In order to provide an institution where the subjects could be studied, Trommsdorff offered instruction in chemistry, various branches of pharmacy and physics. He provided an excellent garden containing thousands of rare plants for the study of botany. He engaged Professor Bernhardi to teach the subjects of zoölogy, mineralogy and crystallography. He obtained the services of Professor Weingærtener and Dr. Mensing in the teaching of mathematics. Special lecturers gave instruction in Latin, Greek, French, Italian and English. The term lasted one year, beginning immediately after Easter. No one was admitted to the institute during the term and an application for admittance had to be made no later than during the month of January of each year. Only students highly recommended were admitted. They lived in Trommsdorff's home, where he provided sleeping quarters but no food. It was Trommsdorff's intention to limit the enrollment and the first year of the existence of his institute he accepted only one student. Gradually the number increased but he never permitted the enrollment to exceed twenty.

In the year of 1829, Trommsdorff announced that he would close his institute. He now realized that a number of institutions had been organized, providing scientific education. Not only had the universities included the necessary subjects but in addition other teachers had founded institutes of similar kind. For example, Professor Schweiger had opened a pharmaceutical institute in Holland. Dr. Wackenroder opened one in Jena. Professor Liebig had founded a similar institute in Giessen.

Among the very numerous pharmaceutical researches carried out by Trommsdorff and his pupils, we might mention the analysis of guajac wood; of guarana; of cauliflower; of caraway; of valerian, in which he discovered valerianic acid; of cascarilla; of coriander and many other barks and roots.

Other publications of Trommsdorff include the following: 1. "Systematic Handbook of Pharmacy"—four editions, 2. "Methods of Pharmaceutical and Chemical Experimentations"—three editions, 3. "Handbook of Pharmaceutical Materials"—three editions, 4. "New Pharmacopœia" corresponding to the present condition of Materia Medica and Pharmacology, 5. "Systematic Handbook of Chemistry"—eight volumes and many others.

Trommsdorff's death occurred on the 8th of March, 1837.

If we are to evaluate Trommsdorff's influence upon scientific pharmacy, we must recognize the fact that he was the first of a group of German scientists who insisted upon the idea that pharmacists must be scientific men; they must be well educated in order to be so considered.

Among pharmacists of his day, we may mention Christian Bucholz, Johann Schrader, Karl August Hoffman and Johann Goettling. All of these were true German characters, whose outstanding traits were truth, sincerity and frankness.

As teachers in various universities or of their own institutions, they combined unusual skill in experimentation, with clear and interesting presentation of their subjects. Among this group Trommsdorff was rated as the best. We, as Pharmacists—a hundred years after his death—must not fail to acknowledge our indebtedness to him who was instrumental in putting pharmacy on a scientific basis, and who never failed to proclaim the idea that pharmacy is a most important branch of the healing art.

(Section Papers concluded on pages 73–75.)

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council." —Part of Chapter VI, Article VI of the By-Laws.

ARTICLE III of Chapter VII reads: "The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, *and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it.* And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association."

ARTICLE IV of Chapter VII reads: "Each local branch having not less than 50 dues-paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates."

Reports of the meeting of the Local Branches shall be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten with wide spaces between the lines. Care should be taken to give proper names correctly and manuscript should be signed by the reporter. *Please advise us of changes in Roster and mail reports promptly.*

CHICAGO.

The 246th meeting of the Chicago Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held Tuesday evening, November 16, 1937, with President Emig presiding. The entire evening was devoted to an illustrated lecture on the "Production, Purification and Uses of Glycerin" given by A. H. Ziegler of Armour and Company. Mr. Zeigler devoted the first portion of his talk to an historical résumé of glycerin manufacture, mentioning that the substance was first prepared by an apothecary, Karl W. Scheele. After discussing the various fixed oils and fats from which glycerin is obtained, the speaker outlined the different methods of fat splitting with a rather extensive description of soap making and its relation to the production of glycerin. By means of slides the course of glycerin concentration in the resulting spent lye solution was illustrated through the various stages. Interspersed were slides showing the machinery, such as evaporators, stills, condensers, etc., so that a comprehensive idea of the technical apparatus involved could be gained.

The technical uses of glycerin as an explosive raw material, as an antifreeze, for tobacco in dyeing of cloth and in synthetic resins, were described. The use of glycerin as a lubricant for gasoline pumps was mentioned as an example of a little known application of the substance. Many other applications also were mentioned.

In the medicinal field, glycerin as a solvent, moistener and sterilizing agent was discussed. The final portion of the paper was devoted to a review of the physiological effects of glycerin with the statement that the only known toxic action occurs when the substance is used intravenously and intramuscularly, in rather large amounts.

The speaker brought with him samples of the various fats, some of the soaps and the crude stages of glycerin which were shown to the group. After a rising vote of thanks the meeting was adjourned.

RALPH E. TERRY, *Secretary*

DECEMBER.

The 247th meeting of the Chicago Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held Tuesday evening, December 14, 1937 at 8:00 P.M. at the West Side Professional Y. M. C. A. building. President Emig called the meeting to order and appointed the following nominating committee: Dr. G. L. Webster, Mr. Chas. Lanwermeyer and Wm. Gray. Harry Lerner then presented an interesting paper on "Maintenance of Standards" with special reference to the enforcement of the Pharmacy Act.

The speaker of the evening was Mrs. Elizabeth Bass, in charge of the Bureau of Narcotics, 9th Federal District, Treasury Department, who outlined the recently enacted Cannabis Law. Mrs. Bass introduced the topic with a short history of the Harrison Narcotic Law and its pur-

poses, then followed with a discussion of the reason for the enactment of the regulations covering cannabis, pointing out the physiological and sociological results from the indulgence in the drug. Mentioning the passage of the State law in Illinois was found to be insufficient, stress was laid on the fact that for the Federal law to become effective, it was necessary to make it a tax bill. This was done by providing for licenses with the payment of the fee of $1.00 for the physician and $3.00 by the druggist, with greater amounts for the manufacturer and wholesaler. The keeping of records and exercise of care as in the case of narcotic prescriptions and orders will furnish a ready means of checking on possible violations. The similarity of the two laws is apparent upon close study, but because of the lesser use of cannabis in present-day medicine, these new regulations will result in its abolishment from the list of therapeutic agents.

Mrs. Bass then gave some very interesting experiences of a general nature which the Department has had in the enforcement of these regulations with particular mention of the extent to which the plant has been found growing in the Chicago area and the suppression methods found necessary under the state laws. Grown to some extent in the middle west as a cordage fiber, the plant has escaped and has been found growing as a weed along water courses and in weedy fields. Considerable work must be done to eradicate it and prevent its illegal cultivation in the future.

As a conclusion to her lecture, Mrs. Bass mentioned that the regulations would be subject to revision, in fact, two revised versions have been issued to date; and that further changes would be found necessary in all probability. After a rising vote of thanks the meeting was adjourned.

R. E. TERRY, *Secretary-Treasurer.*

THE LOUISVILLE COLLEGE OF PHARMACY STUDENT BRANCH.

The Louisville College of Pharmacy Student Branch held its first real instructive meeting of the year on January 5th. Interesting talks were made by J. P. Forgy and J. B. Moore, on "Prescription Prices," after which a general discussion was entered into by the entire Student Branch.

Meetings have been held each month, of more-or-less a business and reorganization nature; and much time has been given to a membership drive. Results are in evidence and it is thought that within another month the Student Branch will be bigger and stronger than ever.

The following officers were elected:

President, Henry Zurlage; *Vice-President*, J. P. Forgy; *Secretary*, Hal Acuff; and *Treasurer*, Jack Dorsey.

HAL ACUFF, *Secretary.*

D. C. BRANCH, A. PH. A.

The January meeting of District of Columbia Branch, A. PH. A. was held on January 17th, at the Cosmos Club. The newly elected president, L. E. Warren, presided. Dinner was served and ladies graced the occasion. Several addresses were part of the program—"A Brief History of Medicinal Plant Culture in the United States," by A. F. Sievers, Senior Biochemist, Division of Drug and Related Plants, Bureau of Plant Industry. H. C. Fuller contributed to the latter address, and Abraham T. Schwartz, Chief Pharmacist at Naval Hospital, presented an interesting report. Reports of the meetings will appear in the February JOURNAL.

OFFICERS OF THE NEW YORK BRANCH FOR 1938.

President, Otto F. A. Canis, 263 Grove St., Cedarhurst, L. I.

Vice-President, Rudolf O. Hauck, 154 Ogden Ave., Jersey City, N. J.

Secretary, Horace T. F. Givens, 115 W. 68th St., New York City.

Treasurer, Turner F. Currens, 59 E. 11th St., New York City.

Committee Chairmen: Membership, Frederick C. A. Schaefer, 170 Nassau Ave., Brooklyn, N. Y.; *Professional Relations*, James H. Kidder, 19 W. 60th St., New York City; *Education and Legislation*, Robert S. Lehman, 295 Washington Ave., Brooklyn. N. Y.; *Audit*, Ernst A. Bilhuber, 154 Ogden Ave., Jersey City, N. J.; *Program*, David J. Mason, 1350 Fulton Ave., Bronx, N. Y.

Delegate to the House of Delegates and Secretary, Remington Medal Committee, Hugo H. Schaefer, 600 LaFayette Ave., Brooklyn, N. Y.

NEW YORK.

By invitation of the Kings County Pharmaceutical Association, the regular meeting of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the Brooklyn College of Pharmacy, Long Island University, Brooklyn, N. Y., on Monday evening, December 13, 1937. President Schaefer presided and about sixty members and guests were present.

The minutes of the November meeting were approved as read.

The report of the treasurer showed a balance of $339.12.

Mr. Hauck reported that the application of Mr. Sol Rosenberg had been received.

Chairman Lehman, of the Committee on Education and Legislation, reported in part as follows:

"The Black-Connery Wage and Hour Bill passed by the Senate at the last session will come up for debate on December 13th. What the final outcome of this legislation will be, is problematical, as there are many divided opinions at the nation's capital.

"Senator Copeland has re-introduced his bill for the regulation of poisonous drugs. Impetus to such legislation was given by the many deaths caused by the Elixir of Sulfanilimide.

"Representative Celler of New York recently asked the Federal Trade Commission to investigate the allegations that Retail Drug Organizations have tried to force wholesale news-dealers to suppress magazine articles, addressed to consumers, which had been designed to furnish facts about price maintenance.

"The Federal Trade Commission recently ordered the Kimball Laboratories to cease and desist representing Kimball Tablets as an effective remedy or cure for, or have any therapeutic value in the treatment of stomach trouble, ulcers of the stomach, indigestion, dyspepsia and gastritis.

"The Washington representative of the N. A. R. D., Rowland Jones, Jr., warns against the attempts that are in the offing to repeal the Fair-Trade Legislation which is so vital to the further existence of the small retailer.

"Attorney General Bennett of New York State, in an address before the session of the Interstate Commission on Crime, urged the enactment of uniform Marihuana laws in all of the states. Many peddlers of the drug are former bootleggers who have found a new field for their talents. The smoking of *Reefers* and *Goof-butts* has increased so rapidly as to become the nation's foremost narcotic problem."

Doctors Anderson, Kidder and Wimmer were appointed as a nominating committee and directed to report at the January meeting.

There being no further business the meeting turned to the Scientific Section, which was a symposium on "Improving Relations among the Health Professions." President Schaefer expressed regret and sympathy for three of our scheduled speakers: President Edgar S. Bellis, of the New York State Pharmaceutical Association; Dr. Arthur Driscoll, vice-president of the New York State Medical Society and Dean Hugo H. Schaefer, of Brooklyn College of Pharmacy, who were ill and unable to attend.

The speakers were introduced by Chairman David Mason, of the Program Committee.

President Gerstner, of the Allied Dental Council, spoke for the dentists and outlined their organizations. These consist of branches in each of the boroughs, Westchester and New Jersey, which elect delegates to the Dental Council, and the latter speaks for the whole, some 3000 dentists. He suggested that there be formed a coördinated committee of all three branches of the health professions. We would then have a very effective voice. Prescription writing by the dental profession should be revived.

Martin Sasmor, in commenting, pointed out that the key-note of the talk was organization. We can get nowhere unless we do it collectively. Courses in pharmacology and prescription writing are limited and it is up to the pharmacist to interest the dentist to write prescriptions just as it is the duty of pharmaceutical organizations to contact the dentists, so that they use U. S. P. and N. F. preparations. In line with this the Bronx County Pharmaceutical Association is printing a booklet for dentists for free distribution.

Dr. Harry Goldwag, speaking for the podiatrists, gave a short synopsis of the history of Podiatry. The requirements of the latter have gradually been raised until now they are three years in a school of podiatry preceded by high school and one year of college. There are six

schools of podiatry in the country. There are societies of podiatrists in all counties of the city and in Westchester, all ready to coöperate with the pharmacists. These open up a new field of activity for the latter.

Meyer Feinberg commented on the excellence of podiatrists' prescriptions.

Chairman Fred S. Frankfurter, of the Professional Relations Committee of the Westchester Pharmaceutical Association, speaking for the pharmacists, read the following paper in part:

"While the suggestion that I speak in behalf of the pharmacists of New York in this *Symposium*, aiming for 'Improved Relations among the Health Professions,' necessarily implies the handling of the entire subject and embracing every group contributing to general health, I shall confine my remarks solely to that phase of this all important topic with which I am familiar—the Relationship of the Doctor and the Pharmacist. I hope to that extent to make my humble contribution to the betterment and ultimate solution of our grave problems.

"Before proceeding with the meat of this discussion, I *must* impress upon you the importance of absolute candor, point out to you that we must assume a solemn covenant here and now—that frank and accurate diagnosis is essential in ferreting out the cancers besetting our professions, before treatment and cure can be attempted successfully.

"Throughout the nineteenth and until the end of the first decade of the twentieth century—Pharmacy, like Medicine, Dentistry and Nursing, was regarded generally and practiced as a profession. With the increasing pressure of volume and larger turn-over, the professional standard slowly but steadily gave way to commercialization, until forsooth 'tis largely the older practitioners of my generation who are attempting to maintain the nobler tenets of the scientific profession, and are all but squeezed out of existence and practice by the Druggusts' Business with all that it implies.

"The gradual changes referred to, were evolutions of manifold causes; but of these, too many to enumerate, I venture to point out three main ones.

"(*a*) The unattractive (I might more accurately characterize it as repulsive) physical appearance of the average drug store, so prevalent in the American cities of to-day, as contrasted to the generally attractive and alluring Prescription (now called to differentiate, 'Professional Pharmacy') to be found in all sections of all cities, until commercialization became the key-note of our calling. What was attractive to the eye—had the psychological effect of instilling a reliant confidence in the patronage, so that in the days that I recall, the pharmacist not only compounded the prescription (and to that extent contributed toward the cure the doctor aimed for) but acted in the dual capacity of the neighborhood friend and confidante.

"(*b*) I have pointed out my frank conviction concerning the primary cause of the deteriorating processes which have brought pharmacy to its low estate and I trust my medical friends to accept my assertion with sympathetic understanding that the second cause is the insufficient teaching and training of practical Therapeutics and applied Pharmacology in the Medical Schools and during internship during the past two decades.....

"(*c*) The third factor might best be referred to as the main one, being responsible for the inexcusable deterioration, if not more accurately expressed, disintegration of the former type of generally high principled neighborhood pharmacist, and has been brought about by the greediness and lack of consideration toward their distributor, the retail pharmacist, on the part of some pharmaceutical manufacturers, who have insiduously altered the status of compounding pharmacists—to that of dispensing druggists, if not to the salesman of packaged goods. The transition has brought with it also—the conversion of the Pharmacy to the variety store.

"Of course many other factors have entered into the creation of the conditions prevailing in pharmacy to-day, but time prevents discussion of these.

"Conscious as I am that constructive criticism to be effective, entails the responsibility of suggesting remedies, and can be of no avail if the diagnostician fails to write the proper prescription, might I point out what to me appear the most effective immediate ends to strive for.

"*First*, it is obvious that not all of us can immediately or radically convert our stores into strictly professional pharmacies (though we all can—and should, practice pharmacy as a profession). We might readily take a leaf out of Tom Dewey's book and apply his political house cleaning, and do likewise with our daily tasks. Surely, you all must recognize to what I refer in the main—but an urgently necessary reform, as I see it, is to resume the former practice of personal

touch and responsibility and replace the present general craze for mass displays in windows and stores, denuding the store of its personality and individuality.

"*Secondly*, I conceive it as one of the fundamental needs of the physician and pharmacist to strive for greater understanding and coöperation of our two professions, and in my opinion, no need is greater than to aim for closer working arrangements between the medical and pharmaceutical colleges. I strongly urge a standing committee representing both professions, whose function it shall be to work toward the achievement of this keenly desired and much needed reform.

"*Thirdly*, recognizing, as I do, the harshness of my conclusion, as to the practices in vogue by the pharmaceutical manufacturing houses—I of course realize their contributions to medicine and pharmacy, and our need of them, so that I must point out that it is *reform* of these manufacturers that I urge—and not their elimination.....

"Since the 'Council on Pharmacy' of the A. M. A. is primarily interested in the therapeutic phase of the products presented to it, for its acceptance, I would suggest that another council be created to supplement its finding—this council, solely composed of members of the A. PH. A., for the purpose of a fuller check-up and investigation of medicinal products presented for acceptance, as to originality, scientific values, professional and ethical standing of manufacturers, and finally, propriety of price to the consuming public.....

"In conclusion, I realize how sketchy of necessity is the handling of so large a subject with all its ramifications within so short a time—but to this extent I crave your indulgence.

"I venture the prediction that if and when socialized medicine becomes a reality the costly medication in vogue at the present time to wit—Parenteral Treatments—Vitamins—Hormones and various proprietaries in untold numbers glutting the market to-day, will be recognized as contributing influences to such changes.

"Also I might add that if the reforms suggested would be brought into effect the 'Annual Pharmacy Week,' now with us, and which is one of the 'Bally-hoos' of the pharmaceutical manufacturers' activities, will no longer be necessary, for it shall have been surplanted by fifty-two pharmacy weeks in each year."

Oscar Kimmel remarked that the modern drug store looked like a miniature department store. To be a pharmacy the store should do at least seventy-five per cent of its business in drugs and sick-room supplies.

A rising vote of thanks was accorded the speakers.

On motion of Mr. Frederick D. Lascoff a vote of thanks was extended Chairman Mason, of the Program Committee, for his work in preparing such an interesting meeting.

HORACE T. F. GIVENS, *Secretary*.

NORTHERN NEW JERSEY.

The thirty-second regular meeting of the Northern New Jersey Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the Rutgers College of Pharmacy in Newark, N. J., December 20, 1937; the following meeting was reported on January 10, 1938.

Robert W. Rodman reviewed the recent developments in the Fair-Trade situation and other legislation of interest to the profession. Assistant Dean Geo. C. Schicks demonstrated the use of syrups as corrective vehicles for medicaments. Of particular interest was a sugarless "syrup" for diabetic patients. Leo Audino demonstrated some new uses for powder papers. Quite interesting discussions followed the talks and demonstrations.

C. L. COX, *Secretary*.

PHILADELPHIA.

DECEMBER.

The December meeting of the Philadelphia Branch, A. PH. A., was held on Tuesday evening, December 14th, at the Philadelphia College of Pharmacy and Science.

Minutes of the last meeting were approved.

Ambrose Hunsberger read the revised By-Laws for the second time and they were adopted as amended. He read a resolution on the death of Mr. H. K. Mulford. It was seconded by Adley Nichols and unanimously adopted by the members.

President Kendig spoke briefly on the life and work of Dean LaWall and announced that a memorial service would be held in the Auditorium of the Philadelphia College of Pharmacy and

Science on January 12th, at 2 P.M., at which time various pharmaceutical and scientific organizations would participate in the service.

Mr. Hunsberger was appointed to draw up a suitable expression of regret on the death of Dean LaWall, to be sent to the family and preserved in the minutes of the Branch.

The president introduced Louis Roeg, of Merck and Co., who discussed the drug Chorthymol. He described its chemistry and its germicidal potency, pointing out that it is 120 times stronger than Phenol when tested against *Staphylococcus aureus*. It is compatible with methyl salicylate, oil of Peppermint and oil of Spearmint. When used in making antiseptic solutions, alcohol may be used which is denatured with any of these substances. He discussed various formulas, especially for preparations which may be used as mouth washes and as antiseptic solutions for the treatment of cuts and lacerations. Chlorthymol is incompatible with alkalies and is most effective in acid solutions. It may be used in mineral oil and in ointments. When properly diluted it is non-irritating.

In the discussion which followed Messrs. Hunsberger, Simpson, Nichols, Munch and others participated.

Dr. Nichols suggested that the paper be published as it contains so much valuable information regarding the use of Chlorthymol.

Mr. Hunsberger submitted a resolution to be sent to the parent body urging that more stringent safeguards be established with respect to new and potent remedies. This was duly seconded and passed.

The members extended a rising vote of thanks to the speaker.

FRANK H. EBY, *Secretary Pro Tem.*

RESOLUTION ON THE DEATH OF HENRY K. MULFORD.

WHEREAS, an all-wise Providence has taken from our midst Henry Kendall Mulford, and

WHEREAS, Mr. Mulford was a staunch and forceful supporter of the principles of the AMERICAN PHARMACEUTICAL ASSOCIATION, and,

WHEREAS, Mr. Mulford evolved many products and processes of recognized value in the treatment of the sick, and

WHEREAS, Mr. Mulford was a staunch and unswerving advocate of high scientific standards for products intended to conserve human life, and

WHEREAS, Mr. Mulford was a loyal and upright citizen and was held in high regard by his fellow-citizens for his unfailing optimism, his unimpeachable integrity, his lofty conception of ethical conduct and because of his happy and inspiring personality,

Therefore be it resolved, that in the death of Henry Kendall Mulford the community has lost a distinguished citizen, American Pharmacy has lost one of its most consistent and constructive supporters, and his friends have lost a congenial and lovable associate, and

Be it further resolved, that the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION does record its sense of profound loss and that it convey its expression of sincere sympathy to the bereaved family and that copies of this resolution be forwarded to the family and also be spread upon the minutes of the Branch.

Committee { AMBROSE HUNSBERGER, ROBERT P. FISCHELIS, ARTHUR K. LEBERKNIGHT.

JANUARY.

The January meeting of the Philadelphia Branch, A. PH. A., was held on January 11th, Temple University, Vice-President Kerlin presiding. The minutes of the last meeting were approved.

A resolution on the death of Dr. Charles H. LaWall was presented and adopted.

A communication from Dr. Eby informed the Branch of the meeting of District No. 2 of the Conference of the American Association of Colleges of Pharmacy and Boards of Pharmacy to be held in Philadelphia at the Benjamin Franklin Hotel on March 7 and 8, 1938. It was moved that the Branch follow the custom established in past years and tender a dinner to the visiting delegates. The meeting approved moving the date of the March meeting from the 8th to the 7th to make this dinner possible.

Dr. Frank H. Eby was appointed to audit the books of the Branch.

Vice-President Kerlin then introduced Dr. Arthur Slee of the National Drug Company whose topic was "Anti-Pneumococcic Serum." Dr. Slee discussed the history of pneumococci and pneumonia, tracing the development of measures for the control of the disease. He stated that now more than ever before pneumonia is recognized as a public health problem, ranking with the social diseases and tuberculosis in importance. Recent developments in serology making the recognition of 32 distinct types of pneumococci possible, and the existence of specific anti-sera for these types has, according to Dr. Slee, made deaths from pneumonia almost wholly unnecessary.

Following his address, Dr. Slee answered questions asked by Messrs. Osol, Blythe, Mellan, Drain and others.

A rising vote of thanks was tendered the speaker.

ARTHUR K. LEBERKNIGHT, *Secretary*.

RESOLUTION ON THE DEATH OF CHARLES H. LAWALL.

WHEREAS, inscrutable Providence has brought to an end the earthly career of our respected member, Charles H. LaWall, and

WHEREAS, Dean LaWall was one of the organizers of this branch and a loyal and diligent worker in its interests since its inception, and,

WHEREAS, his rigid adherence to high ideals in pharmaceutical practice and his insistence upon ethical conduct contributed much to the elevation of pharmaceutical standards, therefore be it

Resolved, that through the death of Charles H. LaWall this branch has lost one of its most distinguished members, a devoted friend, a great pharmacist and an inspiring leader, and be it further

Resolved, that we record in the minutes of the branch this resolution expressing our feeling of profound sorrow and our consciousness of deep loss sustained in the passing of our beloved colleague, and be it further

Resolved, that we convey to the bereaved family expressions of sincere sympathy from the members of this branch, along with a copy of these resolutions.

Committee { AMBROSE HUNSBERGER, ROBERT P. FISCHELIS, ARTHUR K. LEBERKNIGHT.

It was necessary to defer the publication of some of the reports; these will appear in February JOURNAL.

AMERICAN COUNCIL ON PHARMACEUTICAL EDUCATION.

The American Council on Pharmaceutical Education is a committee sponsored by the AMERICAN PHARMACEUTICAL ASSOCIATION, the National Association of Boards of Pharmacy, and the American Association of Colleges of Pharmacy. It was organized in 1932 and is a direct outgrowth of the survey committee created by the National Association of Boards of Pharmacy five years earlier.

In 1927, the National Association of Boards of Pharmacy appointed a committee to make a comprehensive survey of pharmacy for the purpose of obtaining information which might be used as the basis for establishing standards for colleges of pharmacy. This committee was designated the Pharmaceutical Survey Committee. In 1928, the American Association of Colleges of Pharmacy was tendered and accepted an invitation to join the National Association of Boards of Pharmacy in the furtherance of this survey project. Owing, however, to the difficulties experienced in raising the funds necessary to carry on the contemplated work, the project was abandoned and, in 1932, there was organized a new committee consisting of three representatives from each, the AMERICAN PHARMACEUTICAL ASSOCIATION, the National Association of Boards of Pharmacy, the American Association of Colleges of Pharmacy and one representative from the American Council on Education. The new committee was given the title of the American Council on Phar-

maceutical Education, and a constitution and by-laws providing for its organization and the conduct of its business were drafted and approved by the constituent organizations.

The Council held its first meeting in Toronto, Canada, on August 26, 1932. Since then, it has held one or more meetings each year. Its activities up to the present time have been confined largely to the work incident to the drafting of standards to be used in the accreditment of colleges of pharmacy.

The American Council on Pharmaceutical Education, as the foregoing historical statement makes clear, was established for the purpose of setting up an accrediting agency in pharmaceutical education comparable to similar bodies now functioning in medicine, law, dentistry and other professional fields.

It is believed that the Council can, and will, exercise a constructive influence in raising the standards of pharmaceutical education as the desire to meet the requirements for accreditment will stimulate the colleges to improve their teaching facilities and to adhere more rigidly than heretofore to sound educational procedures. It is also believed that the work of the Council will be of great benefit to the examining boards as it will make available to them an authoritative list of the colleges of pharmacy of this country which conform to acceptable educational standards.

From the very beginning of the work of the Council, the American Association of Colleges of Pharmacy and the National Association of Boards of Pharmacy have been kept fully informed of the progress which was being made. Bulletins have been sent regularly to each of the sponsoring associations and annual reports have been made at the national conventions. Matters of specific importance were referred to the constituent groups on numerous occasions and, in the formulation of the standards for accreditment as finally adopted, due consideration was given to the criticisms and suggestions made by the individual boards and colleges.

It is, therefore, believed that the standards which the Council has set up represent the consensus of opinion of the groups most vitally concerned with maintaining pharmaceutical education on the soundest basis possible.

Now that the standards for accreditment have been officially approved, they have been sent to the several colleges of pharmacy, together with a form upon which to make application for accreditment. Accompanying the application was a questionnaire upon which the college requesting accreditment will furnish the detailed information which the Council requires. As soon as the completed questionnaires have been received, they will be given careful consideration by the Council itself and, as promptly thereafter as possible, arrangements will be made to give the various colleges an official inspection. On the basis of the questionnaire returns and the data compiled as a result of inspections, the Council proposes to issue a list of accredited colleges of pharmacy, this list to appear not later than September 1939.

The standards for accreditment as finally adopted deal, among other things, with the organization and administration of the colleges, the subject matter of the curriculum, qualifications of the faculty members, equipment and apparatus available for instructional purposes, with special emphasis upon laboratory and library facilities and financial structure. The Council recognizes that proper financial support is absolutely essential to a sound educational program and, for this reason, will refuse recognition to any college of pharmacy after 1944 that does not receive at least twenty per cent of its income from other than student fees.

While the Council will deal effectively with those conditions in pharmaceutical education which require improvement, it does, nevertheless, feel that four years of study leading to the bachelor degree is sufficient for the present to supply the necessary undergraduate training in pharmacy.

BIOLOGICAL STAINS.

American biological stains represent a value of $100,000 annually. The Associated Press designates these stains as the "eyes" of science and that many of the hopes of biologists for future progress depend on the accuracy of these dyes.

HEROIN SEIZURE.

February 4th, a large amount of heroin, stated to be 400 ounces, was seized in New York City by agents of the Treasury Department's Narcotic Bureau. Several of those arrested had served time in Leavenworth penitentiary, others were addicts.

ASSOCIATION BUSINESS

AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1937-1938.

Office of the Secretary, 2215 Constitution Ave., Washington, D. C.

LETTER NO. 2.

Nov. 1, 1937.

To the Members of the Council:

For the information of the new members of the Council, it is pointed out that motions made by mail in the interim between meetings of the Council require no second.

16. Use of Text of N. F. VI. The following communications have been received from Chairman DuMez of the Committee on Publications:

> "I have reviewed the pages of the manuscript of Dr. W. C. Davison's proposed book on Pediatrics and recommend that he be granted permission to use portions of the text of the N. F. VI for comment in the same, without payment of the usual fee.
>
> "From the sample pages of manuscript, it seems that there can be no possible objection to granting permission to Dr. Harold M. Wright of the University of Minnesota to use portions of the text of the N. F. VI in the preparation of a lecture manual for a course in Prescription Writing. Since the manner in which the text is used will serve to stimulate the prescribing of N. F. preparations, and since the manual is only to be mimeographed, I recommend that permission be granted in this case and that no charge be made, therefore.
>
> "In response to your letter of the 27th instant it is recommended that permission to use the text of the N. F. VI in the preparation of a revised edition of Pharmaceutical Mathematics by Dean Spease be granted and that the usual fee of $5.00 be charged."

(*Motion No. 1*) It is moved by DuMez that W. C. Davison, Harold M. Wright and Edward Spease be granted permission to use portions of the text of N. F. VI in a book on Pediatrics being published by the Duke University Press, in a lecture manual for a course in prescription writing, and in a revision of Pharmaceutical Mathematics, respectively, with the usual acknowledgment in each case and for value received, except in the third case where the usual charge of $5.00 is to be made.

17. Exemption from Taxes under Titles VIII and IX of the Social Security Act. The following letter has been received from the Social Security Tax Unit, Office of Commissioner of Internal Revenue, Washington, D. C.:

> "Reference is made to your letter dated August 12, 1937, with which you transmitted the following information for the purpose of enabling this office to determine the status of the AMERICAN PHARMACEUTICAL ASSOCIATION under Titles VIII and IX of the Social Security Act: (1) Printed copies of office letters dated November 8, 1926, and November 26, 1926; (2) Letter under date of August 5, 1937, addressed to the ASSOCIATION, from the Collector of Internal Revenue, Baltimore, Maryland.
>
> "Exemption from the taxes imposed under Titles VIII and IX of the Social Security Act is claimed by reason of the character and purpose of the AMERICAN PHARMACEUTICAL ASSOCIATION.
>
> "The records of the Bureau indicate that under date of November 6, 1926, exemption was granted to the AMERICAN PHARMACEUTICAL ASSOCIATION for Federal income tax purposes, in view of the specific exemption contained in Section 231(6) of the Revenue Act of 1926. The provisions under which such exemption was so established are similar to the provisions of Sections 811(*b*)(8) and 907(*c*)(7) of the Social Security Act.

"Accordingly, the taxes imposed by Titles VIII and IX of the Social Security Act are not applicable with respect to remuneration for services performed in the employ of the AMERICAN PHARMACEUTICAL ASSOCIATION, provided it has not, subsequent to November 6, 1926, changed the character of its organization or operations or the purpose for which it was originally created."

18. Commission on Standardization of Biological Stains. The following communication has been received from President Gathercoal:

"In our conversation with Dr. H. J. Conn, chairman of the Commission on Standardization of Biological Stains, Agricultural Experiment Station, Geneva, N. Y., it was suggested that the AMERICAN PHARMACEUTICAL ASSOCIATION become a member of the Commission upon invitation issued by the chairman, it being understood that this membership involves no annual dues or cost. Furthermore, it was suggested that the A. PH. A. appoint or elect a member to serve on the Executive Committee of the Commission. I would suggest that both of these invitations be accepted, and that Dr. Louis Gershenfeld be appointed as a member of this Executive Committee."

(*Motion No. 2*) It is moved by Gathercoal that the ASSOCIATION accept the invitation to become a member of the Commission without cost and that Dr. Louis Gershenfeld be named to membership on the Executive Committee of the Commission.

19. Applicants for Membership. The following applications, properly endorsed and accompanied with the first year's dues, have been received:

No. 1, John E. Cass, 791 E. 185th St., Cleveland, Ohio; No. 2, Fred C. Kappus, Superior & E. 115 Sts., Cleveland, Ohio; No. 3, Robert Tzucker, 1401 Alabama St., La Fayette, Ind.; No. 4, Abraham Slesser, 2519 Brice St., La Fayette, Ind.; No. 5, Maurice Vance Miller, 124 DeHart St., West Lafayette, Ind.; No. 6, Harry L. Kendall, 219 W. Lutz Ave., West Lafayette, Ind.; No. 7, Dorothy E. Cimarosa, 1973 Cedar Ave., Bronx, N. Y. C.; No. 8, Leonard Jules Gordon, 660 Empire Blvd., Brooklyn, N. Y.; No. 9, Herman J. Hageman, 7809 83rd St., Glendale, N. Y.; No. 10, Elinor Mabel Jones, 229 Bergen St., Brooklyn, N. Y.; No. 11, Max Krasilnick, 590 Amboy St., Brooklyn, N. Y.; No. 12, Irving J. Miller, 441 Macon St., Brooklyn, N. Y.; No. 13, Yola J. Purifacato, 104–14 120th St., Richmond Hill, N. Y.; No. 14, Lester Rosenstein, 100 E. 96th St., Brooklyn, N. Y.; No. 15, Samuel Sabatino, 31 Locust St., Brooklyn, N. Y.; No. 16, Philip W. McManus, 13340 Woodrow Wilson Ave., Detroit, Mich.; No. 17, Jerry C. Totzka, 503 Mutual Bldg., Lansing, Mich.; No. 18, Emil C. Horn, 4504 W. Burleigh St., Milwaukee, Wis.; No. 19, Erwin J. Gorski, 2462 N. Weil St., Milwaukee, Wis; No. 20, Rudolph C. Hanson, Streeter, N. Dak.; No. 21, Ray C. Stinson, Pembina, No. Dak.; No. 22, William H. Harper, 2818 Sutton Ave., Maplewood, Mo.; No. 23, Elmer E. Hoppins, 3703 St. John, Kansas City, Mo.; No. 24, Charles R. Bohrer, 6 Court Square, West Plains, Mo.; No. 25, Gedeon Richter, Cserkesz u.63, Budapest X, Hungary; No. 26, Alphonse de Caprariis, 6704–15th Ave., Brooklyn, N. Y.; No. 27, Leo I. Forim, 386 Georgia Ave., Brooklyn, N. Y.; No. 28, Meyer Silnutzer, 1123 Oak St., Coatesville, Pa.; No. 29, Joe Wright, 2506 Speedway, Austin, Texas; No. 30, Edgar Leslie Kling, 264 Hane Ave., Marion, Ohio; No. 31, Rene de Montluzin, Jr., 121 S. Beach Blvd., Bay St. Louis, Miss.; No. 32, Roy James Bridges, Pleasant Hill, La.; No. 33, Warren William Messerly, 401 Center St., Martins Ferry, Ohio; No. 34, Walter Adolf Ekeren, Thief River Falls, Minn.; No. 35, Carl Theodore Buehler, 108 S. Maple, Eldon, Mo.; No. 36, Elbert Leland Coffee, 718 Nostrand Dr., San Gabriel, Calif.; No. 37, Charles A. Mellon, 2257 Linwood Ave., Niagara Falls, N. Y.; No. 38, Irwin S. Stoudt, 154–156 N. Ninth St., Reading, Penna.; No. 39, T. S. Roberts, Monticello Drug Company, Jacksonville, Fla.; No. 40, Elmer Michael Plein, 2010 S. Broadway, Boulder, Colo.; No. 41, John Edward Wasson, 717 Main St., St. John, N. B., Canada.; No. 42, Gerald W. Baldridge, 6427 N. Rockwell St., Evanston, Ill.; No. 43, Wilfred Shapiro, 38 Providence St., Worcester, Mass.; No. 44, Chas. S. Matthews, 28 Brookside Drive, Buffalo, N. Y.; No. 45, Abraham David Krems, 1607 E. Jefferson, Seattle, Wash.; No. 46, Andrew W. Nixon, West Webster, N. Y.; No. 47, Fred E. Wilde, 2462 N. Weil St., Milwaukee, Wis.; No. 48, Carl Joseph Klemme, School of Phar., Purdue Univ., La Fayette, Ind.; No. 49, Milton M. Fox, 5363 Wilshire Blvd., Los Angles, Calif.; No. 50, Heinz Frankenstein, 315 W. 106th St., New York, N. Y.; No. 51, Eugene Jacobs, 2201 E. Baltimore St., Baltimore, Md.; No. 52, Solomon Werlin, 101 First St., Troy, N. Y.; No. 53, John A.

O'Donnell, 7838 So. Winchester Ave., Chicago, Ill.; No. 54, Edward John Stava, 212 S. Niagra, Maquoketa, Iowa; No. 55, Edward Ernest Vicher, 1524 So. Lombard Ave., Berwyn, Ill.; No. 56, Oliver F. Vievia, 3 Fuller St., Magnolia, Mass.; No. 57, Arthur E. James, 506 So. Walnut St., West Chester, Pa.; No. 58, M. B. Picker, 1407 Lexington Ave., New York, N. Y.; No. 59, Samuel Cohen, 3100 Brighton & 7th St., Brooklyn, N. Y.; No. 60, Charles J. Walters, 1257 New York Ave., Brooklyn, N. Y.; No. 61, Hyman Bergman, 1540 Sterling Place, Brooklyn, N. Y.; No. 62, Adolph H. Tannenbaum, 1312 St. Johns Pl., Brooklyn, N. Y.; No. 63, Morris Dauer, Kings County Hospital, Brooklyn, N. Y.; No. 64, Sister Mary Sabina Murray, 10th & Castellar St., Omaha, Nebr.; No. 65, Arthur T. Sypniewski, 4748 So. Elizabeth St., Chicago, Ill.; No. 66, E. N. Harper, 200 S. Mulberry St., Muncie, Ind.; No. 67, Minnie M. Meyer, College Sta. Box 124, Pullman, Wash.; No. 68, Charles Garnett Young, Columbia, Ky.; No. 69, William H. Nie, 598 Picke St., Covington, Ky.; No. 70, Charles P. Northcutt, 430 E. Jefferson, Iowa City, Iowa; No. 71, Mary Knezevich, 2063 S. E. Tadd Ave., Portland, Ore.; No. 72, Maurice Wm. Sheehy, 2200 West Flagler, Miami, Fla.; No. 73, Milton Miller, 2301 Barclay St., Baltimore, Md.

(*Motion No. 3*) Vote on applications for membership in the AMERICAN PHARMACEUTICAL ASSOCIATION.

20. Appointment of Standing and Special Committees and Delegates of the Association. The following appointments and recommendations are presented by President Gathercoal (see Item 12, Council Letter No. 1):

Committee on the Study of Pharmacy.—No changes in personnel are recommended. The statement printed in italics "This committee will also act as the Commission on the Survey of Pharmacy," is to be deleted as this commission is now out of the picture. It is understood that the Committee will continue the study of two most important problems in pharmacy; namely, the distribution of medicines by government authorities, insurance boards and others through other channels than the retail pharmacy; and the relations between employer and employee pharmacists.

Committee on Cosmetics.—No change in personnel is recommended for the present, but extensive changes may be made soon. We hope to enlarge this committee and reorganize it to cooperate with the Committee on Recipe Book and to institute a real study of basic formulas for each type of cosmetic preparation. It is our hope indeed that the cosmetic industry will support a fellow in the A. PH. A. Laboratory for the scientific study of cosmetic preparations with a view to utilizing such studies in the Recipe Book formulas. Each of the cosmetic preparations in R. B. II should be studied in comparison with commercial preparations of the same type looking to the improvement of the R. B. preparation. We hope to discuss this project with Chairman Muldoon, Chairman Lascoff, Secretary Welch of the National cosmetic association, and others.

Committee on Local Branches.—This committee should follow up Ex-President Beal's suggestion that each local and student branch of the ASSOCIATION be visited by an officer of the ASSOCIATION to encourage branch activities, A. PH. A. membership, etc.; should assist in providing scientific speakers for the branches, and should help in their programs. The secretaries of the branches are appointed associate members of the committee, and Dr. Ernest Little, Newark, N. J., is appointed as the chairman of the Committee.

Board of Canvassers.—C. Leonard O'Connell, *Chairman*, H. C. Muldoon, Robert W. Gaw, all of Pittsburgh, Pa., are appointed as the personnel of this board.

Committee on Legislation.—No changes.

Committee on U. S. Pharmacopœia.—William J. Husa, Gainesville (1947), is appointed to succeed C. J. Clayton, Denver, whose term has expired.

Committee on Pharmaceutical Syllabus.—Glenn L. Jenkins, Minneapolis (1944), is appointed to succeed himself.

Committee on Pharmacy Week.—It is recommended that the personnel of this committee remain as it is for the time being, but the privilege is reserved of re-organizing the committee at a later date in the year, if such seems desirable.

Committee on Horticultural Nomenclature.—No changes.

Committee on Physiological Testing.—No change in personnel is recommended, but it is suggested that the following statement in italics follow the names of the Committee members—"This committee reports in full to the Scientific Section and in abstract to the House of Delegates."

Committee on Weights and Measures.—T. W. Hoskins of Louisville, Ky., is appointed to this committee. The following statement in italics should follow the names of the committee members.—"This committee reports in full to the Section on Practical Pharmacy and Dispensing and in abstract to the House of Delegates."

Committee on William Procter, Jr., Memorial Fund.—No changes.

Committee on International Pharmaceutical Nomenclature.—On the recommendation of Chairman A. G. DuMez this special committee is dropped from the list of committees, to be revived when needed.

Committee on Lay Press Relations.—At the request of Chairman R. W. Rodman no changes are made.

Committee to Coöperate with Committee from the A. A. C. P. and N. A. B. P. to Obtain Prerequisite Legislation.—In view of the fact that prerequisite legislation is completed in practically all of the states it is recommended that this committee be dropped from the list of committees and that notice to this effect be sent to the secretaries of the A. A. C. P. and N. A. B. P.

Committee on Endowment Fund.—No change is recommended other than that no one be appointed to succeed Theodore J. Bradley, Boston, deceased.

This committee and the AMERICAN INSTITUTE OF PHARMACY Maintenance Committee both deal with financial matters and both should be "Council committees." The two committees are dealing with very similar items and might well be combined. On the other hand, the Council committees On Standard Program and Representation on the American Council on Pharmaceutical Education have but little to do with financial matters but represent other general ASSOCIATION activities and should be listed as ASSOCIATION standing committees appointed by the president. It is recommended that the Council consider these changes.

The American Institute of Pharmacy Maintenance Committee.—George D. Beal, Pittsburgh, is appointed to this committee.

Committee on Pharmacists in the Government Service.—No changes.

Committee on Transportation.—It is recommended that this committee be dropped from the list of committees because rates on railroad transportation are now so fixed and play such a relatively unimportant part in the annual convention of the ASSOCIATION, that the committee has practically no function.

International Pharmaceutical Federation Delegates.—It is recommended that E. N. Gathercoal, Chicago, be relieved of the arduous duties of this delegateship.

American Association for the Advancement of Science Councilors.—E. F. Kelly, Washington, D. C., and, Rufus A. Lyman, Nebraska, are appointed.

National Drug Trade Conference Delegates.—No change except that Geo. D. Beal, Pittsburgh, is appointed to succeed James H. Beal, Fort Walton, Fla., who wishes to be relieved of duty as a delegate.

Committee on Prescription Tolerances.—The following are appointed to this committee: W. J. Husa, Gainesville, *Chairman*, S. L. Hilton, Washington, D. C., R. E. Terry, Chicago, M. J. Andrews, Baltimore, P. H. Costello, Cooperstown, N. Dak., I. W. Rose, Chapel Hill, N. Car., and A. O. Mickelsen, Portland, Ore. It is recommended that the following statement in italics follow the names of the committee members—"This committee reports in full to the Section on Practical Pharmacy and Dispensing and in abstract to the House of Delegates."

Committee on Professional Relations.—No changes.

Committee on Modernization of Pharmacy Laws.—The following appointed to this Committee are: R. L. Swain, *Chairman*, Maryland; Robert C. Wilson, Georgia; Arthur D. Baker, Colorado; E. J. Prochaska Minnesota; S. H. Dretzka, Wisconsin.

Committee on Council on Pharmaceutical Practice.—No changes.

Committee to Study By-Laws.—No change in personnel is made, but it is recommended that this committee should be made a standing committee of the ASSOCIATION and that the title be changed to "Committee on By-Laws."

Committee to Study Courses in History of Pharmacy.—No change in personnel is made but it is recommended that the following statement in italics follow the name of the Committee members—"This committee reports in full to the Section on Historical Pharmacy and in abstract to the House of Delegates."

Committee on Dental Pharmacy.—The following are appointed to this Committee: Geo. C. Schicks, Newark, N. J., *Chairman;* Leslie Ohmart, Boston, Mass.; Lewis G. Freeman, Buffalo, N. Y.; A. O. Mickelsen, Portland, Ore.; C. Leonard O'Connell, Pittsburgh, Pa.; Ralph E. Terry, Chicago, Ill.; M. J. Andrews, Baltimore, Md.; and the change in name is recommended.

General Membership Committee.—It is recommended that Secretary Kelly continue as chairman of this committee and that the following statement in italics shall be included—"The chairman, at his discretion, may appoint an auxillary committee of one member from each state or a sub-committee in each state."

Committee on the Requirements for the Ebert and the Kilmer Prizes.—At the recent annual meeting the Committee on Ebert Prize submitted the following report to the Scientific Section:

> "The members of the committee have individually and collectively reviewed all available papers, published and unpublished, which were eligible for consideration in the selection of the winner of the Ebert prize of 1937.
>
> "Among the eligible papers, a number of them were valuable and of high quality and, in the opinion of the committee, compared most favorably with those awarded the prize in other years. It was unanimously agreed, however, that no single paper was sufficiently outstanding to merit its choice over others under the present rules of selection, as the winner of the highest award American pharmacy can bestow for a research achievement.
>
> "Accordingly, the decision was reached that the prize should not be awarded this year.
>
> "During recent years, a sentiment has been repeatedly expressed by past recipients of the Ebert prize, and members of Ebert prize committees as well as others, that the existing rules for the selection of the winner of the award are no longer adequate. The feeling has likewise been expressed by past recipients of the prize, as well as others, that a change in the physical character of the prize would be most welcome.
>
> "Among the questions which yearly confront each Ebert prize committee, which, of course, does not include that pertaining to the physical character of the prize, the following may be mentioned:
>
> "1. When a winning paper has more than one author, which author should be selected for the award, and upon what definite basis? Or, should each author receive a prize?
>
> "2. Should doctors' or masters' dissertations, or papers taken therefrom, be eligible for the award? If so, who should be selected for the possible award—the candidate for the degree or the individual who directed, and possibly executed, a substantial part of the work embraced by the paper?
>
> "3. When an individual is eligible in the competition for the award, should he be asked to serve on the Ebert Prize committee?
>
> "4. When a clearly outstanding and important discovery or research achievement is reported in a paper, should the award be made at the usual time, or should the award be withheld until the accuracy of the conclusions have been confirmed or substantiated by others?
>
> "5. Should papers presented before sections other than the scientific section be excluded?
>
> "6. Should the Ebert prize committee be limited to three members? Or should sub-committees be established to deal with the papers embraced by the different fields of research?
>
> "For the purpose of deciding these, and possibly other questions of importance, the Ebert prize committee recommends that the ASSOCIATION shall appoint a special committee to study and re-state the ASSOCIATION'S attitude and policy with respect to the qualifications and requirements of those eligible for consideration as recipients of the Ebert prize for the guidance of succeeding Ebert prize committees."

It seemed advisable to name the gentlemen who submitted this report to serve on the proposed committee, to add the chairman and secretary of the Section on Practical Pharmacy and Dispensing, and to also request the Committee to study the conditions laid down by the donor of

the Kilmer Prize and to recommend the conditions under which this prize will be awarded. Dr. M. R. Thompson, H. W. Youngken, C. O. Lee, W. J. Husa and L. C. Zopf are appointed as the members of this special committee and they will be requested to submit their report in advance of the next annual meeting.

E. F. KELLY, *Secretary.*

LETTER NO. 3.

December 18, 1937.

To the Members of the Council:

21. Commission on Standardization of Biological Stains. Motion No. 2 (Council Letter No. 2, page 67) has been carried. This motion should have read that Dr. Gershenfeld be named "to membership on the Commission" and not "to membership on the Executive Committee of the Commission." Unless there is objection, the motion will be considered as corrected and that Dr. Gershenfeld will serve as a member of the Commission.

22. American Documentation Institute. President Gathercoal has appointed Secretary Kelly as the member of the Institute, representing the A. PH. A. (Council Letter No. 16, 1936–1937, page 763 and Letter No. 17, page 765) for a term of three years from January 1938.

23. Local Secretary for 1937–1938. The Local Committee of Arrangements for the Minneapolis meeting have recommended Dr. Charles H. Rogers for election as Local Secretary and Dr. Rogers has indicated his willingness to serve.

(*Motion No. 4*) It is moved by Kelly that Charles H. Rogers be elected Local Secretary for 1937–1938.

24. Time and Headquarters for the 1938 Meeting. The Local Committee of Arrangements for the Minneapolis meeting have recommended that the week of August 22 to 27, 1938, be chosen as the time and the Hotel Nicollet as the headquarters for the Minneapolis meeting.

The time as recommended has been approved by the A. A. C. P. and the N. A. B. P.

The Hotel Nicollet, which will be completely renovated before the meeting, has nearly 600 bedrooms which will be available for those attending the meeting. Single rooms with bath are $3.00 and up; double rooms with bath are $4.50 and up; double rooms with twin beds are $5.00 and up.

The meeting room arrangements are very satisfactory. The Main Ball Room, seating 1000 persons; the Francis I Room, seating 300; the Junior Ball Room, seating 250; and four smaller rooms, seating from 30 to 75 persons, are available, together with several small committee rooms. All of these meeting rooms are located on the Mezzanine Floor and it is convenient to go from one to the other. Good dining room accommodations are available with luncheons from 75¢ up and dinners from $1.50 up. Other hotels are located nearby if additional accommodations are necessary.

(*Motion No. 5*) It is moved by Kelly that the week of August 22nd be approved as the time and the Hotel Nicollet as the headquarters for the 1938 annual meeting.

25. Applicants for Membership. The following applications, properly endorsed and accompanied with the first year's dues, have been received:

No. 74, Louis S. Begin, Box 384, University, Miss.; No. 75, Freeman C. Hays, Sherman, Miss.; No. 76, Kittie L. Sullivan, 207 University, Oxford, Miss.; No. 77, Everett O. Sheffield, P. O. Box No. 74, University, Miss.; No. 78, A. Harriet Walker, 706 S. Second, Oxford, Miss.; No. 79, Ernest E. Puckett, 1712 Cherry St., Vicksburg, Miss.; No. 80, Bless Roy Rusk, University, Miss.; No. 81, Ernest F. Parks, Pharmacy, University Hospital, Ann Arbor, Mich.; No. 82, George N. Johnson, Pharmacy, University Hospital, Ann Arbor, Mich.; No. 83, Robert S. Moser, Pharmacy, University Hospital, Ann Arbor, Mich.; No. 84, F. L. Osborne, 721 14th St., Ashland, Ky.; No. 85, Wm. H. Carney, 2142 Lakeside Drive, Louisville, Ky.; No. 86 Fred. Wm. Snoddy 3222 Short St., Ashland, Ky.; No. 87, David B. Permenter, 502 Euclid Ave., Lexington, Ky.; No. 88, Velma Wilson, Box 1084, Pullman, Wash.; No. 89, Harry Bussard, Box 447, Pullman, Wash.; No. 90, Gilbert Whipps, 1715 C St., Pullman, Wash.; No. 91, Kay Church, Box 477, Pullman, Wash.; No. 92, Charles F. Martin, Jr., 806 Colorado St., Pullman, Wash.; No. 93, Robert E. Lee, 1607 Opal St., Pullman, Wash.; No. 94, Thomas Haley, 2917½ S. Walton, Los Angeles, Calif.; No. 95, Emmett Dixon, 1879 Calif. St., Long Beach, Calif.; No. 96, Samuel Nelson, 3711 Tyler,

Detroit, Mich.; No. 97, Reuben W. Klein, 2041 Puritan Ave., Detroit, Mich.; No. 98, Woodrow Byrum, 808 Professional Bldg., Richmond, Va.; No. 99, George Gay III, 2820 E. Broad St., Richmond, Va.; No. 100, Henry F. Woodward, Jr., 140 Valley Rd., Webster Groves, Mo.; No. 101, P. L. Bouillette, 75 Prospect Park, Brooklyn, N. Y.; No. 102, R. F. Revson, 91 Seventh Ave., New York, N. Y.; No. 103, Setsuko Kobayashi, 1066 W. 36th St., Los Angeles, Calif.; No. 104, Wm. W. Bushard, R. F. D. Box 660, Hunington Beach, Calif.; No. 105, Nettie Schwartz, 2402 Wellington Rd., Los Angeles, Calif.; No. 106, Walter T. Suda, 1351 W. 30 Pl., Los Angeles, Calif.; No. 107, Philip W. Sanford, 837 W. 36th Pl., Los Angeles, Calif.; No. 108, David Berman, 7901 Reseda Blvd., Reseda, Calif.; No. 109, Peter Kalionzes, 427 E. 21st St., Los Angeles, Calif.; No. 110, Ryo Komae, 1104 E. Pico St., Los Angeles, Calif.; No. 111, Norman Applebaum, 2240 N. Beach Wood, Hollywood, Calif.; No. 112, Rudolph Abrams, 954 W. 36th St., Los Angeles, Calif.; No. 113, J. T. Friedman, 244 F. St., Oxnard, Calif.; No. 114, Dorothy Tayles, 1023 W. 36th St., Los Angeles, Calif.; No. 115, Mae M. Liska, 2720 So. Drake Ave., Chicago, Ill.; No. 116, C. H. Counts, Commercial, Ozark, Ark.; No. 117, H. L. Sirmans, Montgomery and Lee St., Montgomery, Ala.; No. 118, Albert N. LePain, 286 Hamilton St., Southbridge, Mass.; No. 119, Nicholas W. Fenney, 570 Elm St., New Haven, Conn.; No. 120, Ray H. Arlin, 860 Ashbury St., San Francisco, Calif.; No. 121, R. C. Arnold, 214 9th St., Saskatoon, Canada.; No. 122, Morris Lefkowitz, 57 Farmington Ave., Hartford, Conn.; No. 123, Frank V. Kara, 16 S. Peoria St., Chicago, Ill.; No. 124, Arthur Rich, 8002 37th Ave., Jackson Heights, L. I., N. Y.; No. 125, Alton Clark, 676 W. Alexanderine, Detroit, Mich.; No. 126, J. M. Dixon, 203 Vernon St., Roseville, Calif.; No. 127, H. J. Bannon, Grove Laboratories, Inc., St. Louis, Mo.; No. 128, Emerson B. Taylor, 6732 First Ave., Seattle, Wash.; No. 129, George Eisele, 7754 E. End Ave., Chicago, Ill.; No. 130, A. J. Richards, 423 Second Ave., Lyndhurst, N. J.; No. 131, D. M. Carter, 2708 Samford Ave., Shreveport, La.; No. 132, Harold Wm. Coles, Mellon Institute, Pittsburgh, Pa.; No. 133, Isidor Liebman, 1326 First Ave., New York, N. Y.; No. 134, Morris L. Colker, 5361 Montgomery Ave., Philadelphia, Pa.; No. 135, McKinley Gassett, Emergency Hospital, Washington, D. C.; No. 136, Sister Mary Octavia Bertram, Mt. St. Rose Sanatorium, St. Louis, Mo.; No. 137, Benjamin Harris, 1081 Main, Worcester, Mass.; No. 138, Sol Rosenberg, 137 Beach 84 St., Rockaway Beach, N. Y.; No. 139, Frank L. Wilson, 21 Hatfield St., Caldwell, N. J.; No. 140, Tom Arase, 2107 Pine St., San Francisco, Calif.; No. 141, John B. Data, 1330 No. University, Ann Arbor, Mich.; No. 142, Mary P. Hall, Hall Drug Co., Clatskanie, Ore.; No. 143, Glen M. Dodd, 1114 N. Stafford, St., Portland, Ore.; No. 144, Fred E. Thomas, 726 W. North, Greenfield, Ind.; No. 145, Donald C. Marsh, 1230 N. W. 21st St., Portland, Ore.; No. 146, B. E. Lapenta, 508 E. Merrill St., Indianapolis, Ind.; No. 147, Frank Fortunato, George Washington Univ., Washington, D. C.; No. 148, Harold Lacy, 1405 Maiden Lane, Pullman, Wash.; No. 149, Joseph B. Jancauskas, Jr., 4715 W. 12 Place, Cicero, Ill.; No. 150, Isador Winer, 3125 S. W. 2nd Ave., Portland, Ore.

(*Motion No. 6*) Vote on applications for membership in the AMERICAN PHARMACEUTICAL ASSOCIATION.

E. F. KELLY, *Secretary*.

NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.

Quoting the *Oil, Paint and Drug Reporter* of October 11th, in part, "full approval of coöperation was voted at its recent annual meeting by the National Wholesale Druggists' Association to the Federal Trade Commission in its efforts to elevate the standards of business and to eliminate unfair competitive practice." The Association also voted approval of legislation to amend the Federal Trade Commission act so as to extend the jurisdiction of the commission to cover advertising and unfair trade practices.

The convention expressed appreciation to the Federal Trade Commission and to Hon. William A. Ayers, its chairman, for his attendance and address before the associate members when working out their plans for distributing and selling merchandise and to the development of an expanded and more highly trained sales force, and to undertake the inauguration of training departments in order that by 1947 the Association's wholesalers will have a total sales force of 5000 men and will produce an annual volume of wholesale drug business of one billion dollars.

The Association re-affirmed its position with respect to new food and drug legislation that would safeguard the health and welfare of the public; and voted to continue efforts to have regulations to exempt narcotics modified and to have regulations 52*a* and 52*b* used to record transactions in the sale of alcoholic liquors simplified.

THE PRINCIPAL CAUSES OF LOW PROFITS IN DRUG STORES.*

BY PAUL C. OLSEN.[1]

In the past ten years I have had the opportunity to examine the individual operating statement of more than three thousand drug stores. Some of these stores have obtained satisfactory profits, others did not produce for their proprietors the profits that they expected, and in a regrettably large number of instances the stores were operating at a loss. In analyzing individually the operating results of these different stores it is not difficult to see why some drug stores are extraordinarily successful and others do not do as well.

The four most common causes that appeared for low profits in drug stores were all causes which the store proprietor or manager can control himself. The fact that these causes of low profits can be controlled successively is proved by the results of stores which did control them and accordingly earned extraordinary profits.

Most common of the causes of low profits in drug stores is inadequate buying control. I believe that inadequate buying control in drug stores results primarily from a disregard of a rather obvious fact. That rather obvious fact is that no profits are made, or can be made, in a retail pharmacy until merchandise is sold. It does not matter how large the promised gross margin if the article cannot be sold.

Fortunately, there is a simple and adequate method of controlling buying in a drug store which has proved successful in the drug stores which have used it. This method requires the use of a buying budget. A buying budget is simply an estimation, month by month in advance, of anticipated sales.

For example, a drug store proprietor forecasts that his September sales will be $2000. His purchases of merchandise in September should not be more than 65 per cent of his anticipated sales, or $1300. Then, as purchases are made in September, they are successively subtracted from the budget, and the amount remaining is the amount that the proprietor of the store still has available for buying in September.

As a practical matter it will be recognized that it is impossible to estimate a month in advance in exact dollars just what sales will be. They may come out for September $1900 or $2100, or some odd figure. This result is easily taken care of by adjustments in the buying budget for the following month of October. If sales in September do not come up to expectations, the buying budget for October is accordingly reduced in proportion to the amount that September sales were less than the proprietor thought they would be.

While it is true that 65 per cent is a fair average maximum for merchandise costs in most drug stores, it must be recognized that sales in any month in a drug store are composed of a variety of items on which merchandise costs vary considerably from this 65 per cent average. In drug stores with sales over $20,000 a year, it is desirable, instead of operating one buying budget for the entire store, to departmentize both sales and purchase records. This departmentization does not need to be elaborate. In most stores the familiar triumvirate of drugs, cigars and soda is sufficient. In such a store the buying budget for the soda department would be set at 50 per cent of anticipated sales; that for the cigar department at from 75 to 80 per cent of anticipated sales, depending upon the degree of price competition

* Section on Pharmaceutical Economics, A. PH. A., New York meeting, 1937.

[1] Philadelphia College of Pharmacy and Science.

prevailing, leaving for the rest of the store a buying budget of 65 per cent of its anticipated sales.

It will be seen that the use of a buying budget, such as briefly outlined above, inevitably forces merchandise purchases to be maintained in a fairly exact ratio with merchandise sales, thus preventing to an astonishing degree accumulation of odds and ends and left-overs of dead and slow-moving stock. As I look at these odds and ends and left-overs of dead and slow-moving stock in various drug stores I am impressed with the fact that virtually all of them are items which the proprietor bought in anticipation of huge gross profits which were not realized because the merchandise did not sell. That is why I say, with all the emphasis at my command, that it is vitally important for a drug store proprietor to maintain a buying budget so as to keep his purchases in the drug store down to a profitable proportion of his sales.

Closely allied with this question of inadequate buying control as a cause of low profits in a drug store, I have found inadequate use of inventory records to be a second cause of low profits. It is no secret that there are thousands and thousands of drug stores which, from the time they were started, have never taken an inventory. I have also seen many hundreds of other drug stores in which the inventory has been taken but no use made of the facts revealed by it.

In my classes at the Philadelphia College of Pharmacy and Science, on the business problems of pharmacy, I frequently speak to students upon the necessity in a drug store of an annual inventory of the merchandise stock. It is encouraging to observe the agreement which most of these students feel with my statements because in their work in drug stores they have seen the lost profits which result from inadequate inventory records. One young man last year went home at Easter to see his father, whose proud boast was that in twenty years in his store he had always made a living for himself and his family, and that he had never felt any need for an inventory of his stock—"he knew what he had."

The young man was unusually persistent, however, so he finally won his father's consent to take an inventory of the merchandise stock. When the father examined the voluminous sheets resulting from the inventory, he remarked acidly to his son, "You have just been wasting your time; this is not accurate. You have a lot of things down here which we do not have. Maybe no records at all for a drug store are undesirable, but worse than that I think are inaccurate records."

The son stood his ground, however, and to the father's amazement almost $2000 worth of merchandise was brought to his attention which he had forgotten that he had, and indeed had been reordering from time to time without any regard for the overstock of it he had in hidden corners of the store. The upshot of the whole thing was that a store housecleaning resulted, and within three months more than $1500 in extra cash had been brought into the store from the sale of merchandise which this proprietor, without an inventory, had forgotten he had in the store ready for sale.

The third of the causes of low profits in drug stores that has become apparent is an inadequate control of cash. I never saw a druggist who would admit that he had enough cash, but I have seen plenty who are astonishingly careless in the handling of the cash that they do have. This carelessness takes a number of forms which would be highly amusing if they were not so costly. One proprietor I know

has a $1500 investment in cash registers, but from the day those registers came into his store he has never bothered to reset the register totals nor to compare the register totals with the cash actually in the drawer. Another proprietor is regularly annoyed by telephone calls from his bank for additional deposits to cover checks drawn. I saw on the top of his roll-top desk eighteen consecutive bank statements unopened. Is it any wonder that he never knew how much money he had in the bank and was chronically behind in paying his bills?

Still another proprietor had the interesting habit of recording at the end of the day the cash receipts in each of his three registers in even-dollar amounts. Multiply these three registers by the 365 days in a year and it will be seen that a substantial cash sum is not accounted for.

Other forms of carelessness in the handling of cash include withdrawals for personal expenses without record or notation being made of them, and the amazingly prevalent practice of carrying around in one's hip pocket the store receipts for a week or two, "until one has time to get to the bank."

Carelessness in handling cash is contagious. If store employees observe that the proprietor is not meticulous in handling cash they inevitably follow his example. This is not only costly to the proprietor but also places unfair temptations in the way of employees.

Fourth in this list of the most common causes of low profits in drug stores is failure to keep adequate bookkeeping records. I have heard the statement made that 75 per cent of the drug stores in this country have no accounting records of any value in controlling business operations of the store. I have no way of knowing whether or not this is true, but all of the observations that I have made tend to confirm the fact that in most drug stores the proprietor either has no records at all or what records he has are utterly useless in guiding him in his daily operations. The plain facts of the matter are that, all too commonly, the proprietor feels that if he takes in enough money to pay his own living expenses, his store operating costs, and to meet his most urgent merchandise invoices, he is getting along all right and there is no need to worry. Perhaps not, but for the proprietor, who for his time and effort wants to get the maximum return, adequate accounting records are a vital necessity.

In the case of one store with an annual volume of sales of over $80,000 the proprietor was able to get year by year as his own income from this large store only $45.00 a week in cash, and some weeks he did not even get that. When a suitable accounting system was installed eighteen months ago in this store the facts soon came to light as to the cause of the proprietor's low earnings from his store. The accounting records permitted a diagnosis which otherwise was not possible. The same ability which the proprietor had used in developing in his store an annual sales volume of $80,000 a year he used to put into effect the necessary plans to correct these profit-destroying conditions. The first year during which the proprietor operated with adequate accounting records his earnings from his store increased from barely $45.00 a week to more than $8000. Certainly his investment in adequate accounting records brought him a handsome return.....

There is nothing new or startling in what I have said, but I feel justified in reemphasizing these four important causes of low profits because of the wide degree to which they appear to be disregarded in the management of many drug stores.....

EDITORIAL NOTES

COMMITTEE ON BRITISH PHARMACY.*

The Pharmaceutical Society of Great Britain has established a Special Committee of Enquiry of which its President, Thomas Marns, was elected chairman at the first meeting on October 19th. The following program was adopted:

"*Economic.*—Study the number of pharmacists and pharmacies in relation to public needs; growth of numbers of shops; growth of numbers of entrants; types of ownership of pharmacies; growth of coöperative societies and multiple-pharmacy companies. Lines along which services of retail pharmacist to public are developing. National Health Insurance Act developments. Development of institutional pharmacy. Extent of dispensing by medical practitioners. Extent of supply of drugs, etc., by unqualified traders. Pharmaceutical Society's qualifications and their suitability to present-day needs. Cost of qualification in comparison with other qualifications. Desirability of an assistant's qualification.

"*Historical.*—Relations between grocers, apothecaries and physicians from seventeenth century. What were circumstances when Society was founded?

"*Parliamentary.*—Pharmacy Bills and enquiries since 1900. Parliamentary activities of similar bodies. Organization of pharmacy for Parliamentary purposes.

"*The Pharmaceutical Society.*—Its development; objects, powers and duties; effect of the "Jenkin" case; constitution of Council. Qualifications for registration (including University degrees and foreign and colonial qualifications). Directions in which constitution might be modernized."

The following sub-committees were decided upon and the Committee was requested to render a report in June; this should be of interest to American pharmacists because of its broad scope. The names of the four sub-committees follow:

Sub-committee 1 (Economics of the practice of pharmacy in shops).

Sub-committee 2 (Economics of the practice of pharmacy on the wholesale and manufacturing scale and in the public services).

Sub-committee 3 (Historical and parliamentary).

Sub-committee 4 (Pharmaceutical Society).

* *Pharmaceutical Journal*, November 6, 1937.

SWEDISH CENTENARY.

The Royal Pharmaceutical Institute, Sweden, which is stated to be the oldest pharmaceutical college in Northern Europe, celebrated its hundredth anniversary on December 3rd with a banquet in the magnificent hall of the Riddarhus (Knight's House), Stockholm. King Gustav and Prince Carl were present together with representatives of the Swedish Government, Swedish scientific institutions, the Royal Medical Board, the pharmaceutical institutes of Denmark, Finland and Norway and of Swedish pharmacy. Dr. E. Ohlsson gave a short history of the Institute and paid homage to former professors, especially Messrs. P. F. Wahlberg and C. G. Mosander, the latter of whom, through his study of the rare earths, discovered four new basic substances. Addresses were read from pharmaceutical societies, medical boards, veterinary and pharmaceutical colleges in other parts of Scandinavia. Several large donations were received, including one of 20,000 kronor from a donor who wished to remain unknown. The interest is to be used to assist pharmaceutical candidates who wish to pursue their studies further. The sum of 17,000 kronor has also been set aside for the equipment of a modern laboratory for galenical pharmacy. A gold medal is to be awarded every second year to pharmaceutical candidates who have contributed to the advancement of pharmacy.—*The Chemist and Druggist*, January 5, 1937.

A WORLD MEDICAL CENTER IN WASHINGTON.

The proposed Naval Medical Center is progressing with a budget of $4,850,000. According to the *Washington Evening Star* of January 8th, "it will constitute a very large unit in a development, in progress without attracting much attention for some years, which is making Washington the medical capital of the world. Other units are the National Institute of Health of the Public Health Service, the great Army medical center which has grown up around Walter Reed Hospital, the agricultural research center at Beltsville, where many experiments have dealt with fundamental medical problems; the INSTITUTE OF PHARMACY; the diagnostic center of the Veterans' Administration at Mount Alto and such older institutions as the Surgeon General's Library. Only second in importance is the great expansion and improve-

ment in the past few years of the three local medical schools, George Washington, Georgetown and Howard. The first two especially have become far more than institutions for the systematic education of physicians. They have become world centers of research. A striking example of this expansion is the Brain Institute recently established at Georgetown for pure research in brain physiology and anatomy. Almost unnoticed in this development has been the establishment this year of the William A. White School of Psychiatry, which promises to raise Washington above Vienna as a world center for research in this branch of medicine.

The activities of these units is at present uncoördinated and there is no immediate proposal to coördinate them. Perhaps the best interests of all will be served if each pursues its individual way in an atmosphere of friendly coöperation.

The fact remains that in the field of medical research America has arrived. Vienna and Paris have lost their prestige in this respect. They began slipping after the war. And of all this American development Washington has become, without any conscious design on the part of anybody, the center which henceforth may be expected to attract students from all over the world.

Dr. A. R. L. Dohme has presented a photograph of the late **Joseph P. Remington** from the Photograph Album of his mother, the late Mrs. Charles E. Dohme. Also, a framed group photograph of the Members of the Board of Trustees of the U. S. Pharmacopœial Convention present at the Seventh Annual Meeting, held at the Southern Hotel, St. Louis, May 2, 1907. They are: Dr. Henry M. Whelpley, St. Louis; Charles E. Dohme, Baltimore; Joseph P. Remington, Philadelphia; Frederick W. Meissner, La Porte, Ind.; James H. Beal, Scio, Ohio.

Mrs. H. M. Whelpley has donated to the AMERICAN PHARMACEUTICAL ASSOCIATION two wooden microscopes. They are accompanied by a note from Frederick A. Parsons, Assistant Secretary of the Royal Microscopical Society, London, England, under date of June 2, 1903. The letter accompanying the microscopes reads as follows:

"Dr. H. M. Whelpley, I am directed to acknowledge receipt of your letter dated May 5th, which with the photographs enclosed, has been submitted to Mr. E. M. Nelson who is of the opinion that the microscope was probably made by Brander of Augsburg, about 1750."

A newspaper clipping in connection with the microscopes refers to an occasion in St. Louis called, "An Evening with the Microscope," and was a most successful meeting of the Academy of Science in St. Louis. Dr. Whelpley in a short talk outlined the object of the displays. Aside from the display of microscopes the visitors and members examined the slides and displays.

Mrs. H. M. Whelpley has also presented three volumes of "The Analysis of Drug Powders," an Atlas for apothecaries, druggists and students of pharmacy, prepared by Dr. Ludwig Koch, Professor of Botany at the University of Heidelberg. There are many illustrations; the first volume relates to Barks and Woods; the second to "Rhizomes, Tubers and Roots; and the third is divided into Plants, Leaves and Flowers. The volumes were collected in 1902, 1904 and 1907, by the late Dr. W. M. Whelpley. The shipment also included many pharmaceutical publications and a number of other books.

The Whelpley collection (Dr. and Mrs. Whelpley) fits in a number of displays of the AMERICAN INSTITUTE OF PHARMACY: Photographs, microscopic slides, manuscript, documents, badges, letters, etc., to which from time to time Mrs. Whelpley is making additions.

PAN-AMERICAN MEDICAL CONGRESS.

More than 300 American physicians, members of the American Medical Association, sailed January 15th on a fifteen-day cruise to Havana and the West Indies to participate in the Pan-American Medical Association Congress to be held in Havana beginning Jan. 18th.

The American group is headed by Dr. Joseph J. Eller, director general of the Pan-American Medical Association and dermatologist to the City Hospital of New York. In Havana the United States group will join medical authorities from all South American and West Indian countries.

The delegates took with them a letter from President Roosevelt wishing every success and coöperation among all peoples in the Western Hemisphere.

THE HARVARD MICROSCOPE.

The Harvard microscope, designed by Prof. L. C. Graton in collaboration with Dr. E. B. Jane, Jr., can magnify objects up to 50,000 their normal diameter. Its application is chiefly in the geological department.

DETERMINING AMOUNT OF ODOR.

Prof. Rudolph Gmelin, of Mannheim, Germany, has reported to the German Society of Physicists and Mathematicians the invention of an instrument which detects odors much in the same manner as the human nose. The instrument will be used in tunnels where there is auto traffic in order to determine the amount of impurity in the air.

President Tom Smith, of the N. A. R. D., was tendered a testimonial dinner on December 3rd, by members and pharmacists of Wilmington, Delaware. National and State Associations were represented.

F. W. Connolly, Dorchester, has celebrated the fifty-second anniversary of his pharmacy, maintaining the professional phase during these years.

He has been making valuable donations to the Museum of the AMERICAN INSTITUTE OF PHARMACY.

The resignation of **F. V. McCullough,** of New Albany, as secretary of the Indiana Pharmaceutical Association has been announced.

Mr. McCullough, who served the association for many years as its secretary, has also given up his position as editor of *The Indiana Pharmacist,* official publication of the association.

The new address of the association and of *The Indiana Pharmacist* is 806 Test Bldg., Indianapolis; **Mary Louise Byrn** is acting secretary.

Alice-Esther Garvin, secretary of the Connecticut Pharmaceutical Association and editor of the "Connecticut Capsule," is ranked as one of the ten outstanding Connecticut women in the new publication of the American Historical Society of Connecticut year book to be issued this spring.

The biography will mention Miss Garvin's work as contributor to numerous publications, author of various poems and a play, and her work in the lecture field.

In her extensive travels, Miss Garvin, among other things, has made a thorough study of pharmacy. At present, she is writing her first long book, tentatively entitled, "Pharmacy under Fascism." She is now planning a trip to Russia for further study.

Following publication of his third book "Ancient North Yarmouth and Yarmouth," Druggist-Author **William Hutchinson Rowe** has announced that he is considering writing a volume devoted to the growth of pharmacy in Maine.

Allen Taylor, of Elizabethton, Tenn., has been named to the State Board of Pharmacy here by Governor Gordon Browning, succeeding **Harold L. Ellis.**

New York State Pharmacist for January presents **Dr. Hugo H. Schaefer** by the *Managing Editor,* Milton S. Malakoff, who brings out the high points of an active pharmacist. An interesting statement is that, where Dr. Schaefer now is looking after the affairs of an institution, devoted to education of pharmacists, he, as a youth, attended school in that locality.

NEW HAMPSHIRE PHARMACEUTICAL ASSOCIATION.

President George A. Moulton, of New Hampshire Pharmaceutical Association, issues *bulletins* to the members. The December letter gives instructions relative to Fair Trade Contracts and explains the importance of proper filing.

The Mid-Winter Meeting of the Association was held January 25th; the Association also sponsored a January cruise to Cuba for 9 days and enjoyed the visit with the Cuban Pharmacists. The *Havana Post* featured the visit of the visitors; these meetings not only present an opportunity to become acquainted with the members, but also get the views of pharmacists in nearby countries. President Moulton has taken advantage of opportunities.

Drug Topics of January 31st shows O. Henry (W. S. Porter), a balance used by him in the store of Morley Drug Company, Austin, Texas, and L. S. Doyle, who clerked with O. Henry in the latter store. Several years ago, in going through some records, a counter blotter was found on which O. Henry wrote one of his first short stories.

INTERNATIONAL PHARMACOPŒIA.

Dr. L. van Itallie in an address during the Copenhagen meeting of the International Pharmaceutical Federation brought up the question of an International Pharmacopœia, not as a new subject, but an effort dating back to the first International Congress of Pharmacy in Brunswick and discussed at each succeeding congress. A committee of seven, drawn from different countries, assisted by a number of collaborators, representing scientific and practical pharmacy, will take up the subject.

THE BULWINKLE-LaFOLLETTE BILL.

The U. S. Public Health Service is interested in the Bulwinkle-LaFollette bill and is supporting it.

Secretary Kelly said it was gratifying that the U. S. P. H. S. had taken the initiative and called his attention to the measure and suggested that representatives of the profession of pharmacy should be present at various conferences of public health officials and others which will be held later to discuss all the phases of the bill.

President E. N. Gathercoal, A. PH. A., is adjusting the laboratory and fixtures in the AMERICAN INSTITUTE OF PHARMACY. On February 1st, he was the speaker at the meeting of Philadelphia Branch.

Secretary **Robert P. Fischelis,** of the New Jersey Board of Pharmacy, discussed "Proprietary Medicines" in the *Scientific Monthly* for January.

E. P. Enloe, of Rome, has been elected member of the Georgia Board of Pharmacy, succeeding **H. M. Herrin.**

TEMPLE UNIVERSITY.

President-Elect J. Leon Lascoff, of the AMERICAN PHARMACEUTICAL ASSOCIATION, chairman of the Recipe Book Committee, will be honored by Temple University on February 15th, when the university will confer upon him the honorary degree of Doctor of Science in recognition of his outstanding services in the field of Pharmacy.

Dr. Lascoff will be one of five persons prominently identified with local, state and national affairs, who will receive academic distinction from Temple. The occasion will feature the traditional observance of "Founder's Day" at the university. Dr. H. Evert Kendig, Dean of Temple's School of Pharmacy, in a brief citation, will present Dr. Lascoff for the honorary degree. Dr. Lascoff, whose home is in New York, was the recent recipient of the coveted Remington Medal for conspicuous service in the pharmaceutical profession.

BALTIMORE.

The Tydings National Fair Trade Appreciation Dinner was held in Baltimore on February 3rd, at the Lord Baltimore Hotel. A large attendance was present from Baltimore, District of Columbia and various parts of Maryland and Delaware.

The Baltimore Branch A. PH. A. elected the following officers for the ensuing year: *President,* Albert C. Gakenheimer; *Vice-President,* Andrew F. Ludwig; *Secretary-Treasurer,* Robert S. Fuqua.

The Charter Day Banquet of the University of Maryland was held in Baltimore, January 20th.

R. L. Swain addressed the University of Maryland Medical Forum on December 17th, in the Wilson Memorial Auditorium of the University Hospital, Baltimore. He spoke on, "Medical Advertising and the Law."

DR. CHARLES H. LaWALL MEMORIAL MEETING.

A memorial service for Dr. Charles H. LaWall was held Wednesday afternoon, January 12th, at 2:00 o'clock at the Philadelphia College of Pharmacy and Science.

The program prepared for the occasion included: Remarks by the Presiding Officer; Representatives: Board of Trustees, Col. Samuel P. Wetherill; Faculty, Dr. J. W. Sturmer; AMERICAN PHARMACEUTICAL ASSOCIATION, Dr. E. F. Kelly; American Association of Colleges of Pharmacy, Dr. Ernest Little; Revision Committee, United States Pharmacopœia, Dr. E. Fullerton Cook; The Franklin Institute of the State of Pennsylvania. Dr. Henry B. Allen; State Board of Chemists, Bureau of Foods and Chemistry, Dr. Elmer E. Harter, Jr.; *American Journal of Pharmacy,* Dr. Ivor Griffith; Wagner Free Institute of Science, Dr. Samuel C. Schmucker; Pennsylvania Pharmaceutical Association, Mr. Ambrose Hunsberger; Alumni Association, Philadelphia College of Pharmacy and Science, Mr. John E. Kramer; Local Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION, Dr. William A. Pearson; Student Body of the Philadelphia College of Pharmacy and Science, Mr. Warren R. McPeek.

OBITUARY.

J. T. Coulson, the 16th president of Texas Pharmaceutical Association and vice-president of Southwestern Drug Corporation, Dallas, died January 26th, after a brief illness. He was a prominent Texas retail druggist for many years and took an active part in collecting the Texas fund for furnishing the Editor's Room in the AMERICAN INSTITUTE OF PHARMACY.

M. L. STEELE.

Dr. Morgan Lewis Steele, 65, chief pharmacist of the Naval Dispensary, Bureau of Medicine and Surgery, died January 31, 1938, in Naval Hospital. He had been ill about two months.

Dr. Steele, who lived at 3017 Dent Place, N.W., held the degree of doctor of pharmacy from the old Columbian University, now George Washington University.

Born in Lansingburg, N.Y., Dr. Steele was educated in the public schools of Albany, N. Y. before attending the university here. During the World War he was warrant officer on the Nansemond and made several trips between the United States and France.

A veteran of many years' service in the Navy, Dr. Steele in the late 90's served on the old monitor type of war vessel at Richmond, Va. He also had held posts at the Philadelphia, San Francisco and Hawaiian Navy Yards; at the Naval Academy and the Naval Hospital here. He had been chief pharmacist at the dispensary for the last seven years. He was a member of the Potomac Lodge of Masons here.

Surviving are his widow, Mrs. Mary E. Steele; a son, Edward F. Steele; a granddaughter, Florence Eleanor Steele, and a sister, Mrs. Charlotte Steele Gardner, all of this city.

Funeral services were held at the Fort Myer Chapel, following brief services at the residence. Burial was in Arlington National Cemetery.

EDWARD WHEELOCK RUNYON.

Edward Wheelock Runyon, president of Boericke & Runyon, Inc., manufacturer of homeopathic pharmaceuticals and operator of a homeopathic pharmacy, New York City, died December 19th of pneumonia. He became a member of the A. PH. A. in 1875 and was eighty-six years old.

Born in Chicago, Mr. Runyon as a boy of thirteen served in the Civil War as postmaster of the Ohio Volunteer Regiment, of which his father, Colonel Clark Runyon, was commander. After the war he came to New York, worked as an apprentice in a pharmacy and was graduated from the New York College of Pharmacy in 1873. Mr. Runyon established the first pharmaceutical laboratory on the Pacific Coast in San Francisco in 1887, and later became professor of chemistry at the California College of Pharmacy, of which he also was dean. With Dr. William Boericke, he established a San Francisco firm for the manufacture of homeopathic pharmaceuticals, with branches in other west coast cities. The business was extended to New York and Philadelphia in 1895. Mr. Runyon had been secretary of the board of trustees of the New York College of Pharmacy, and was a member of the New York Veteran Druggists' Association, the Chemists' Club, the American Museum of Natural History, the New York Zoological Society and the New York Microscopical Society.

Surviving are three daughters.

We are advised of the death of Fred W. Ritter, former president of Arizona State Board of Pharmacy and druggist of Phoenix, on December 16th.

SOCIETIES AND COLLEGES.

The National Association Boards of Pharmacy will hold its annual meeting August 22nd–23rd in the Nicollet Hotel. President H. C. Byrd, of the University of Maryland, will be the speaker at the Joint Session of the American Association of Colleges of Pharmacy and the National Association Boards of Pharmacy.

President Coffman, of the University of Minnesota, will be guest of honor and speaker of the two bodies at the Joint Dinner during the convention.

Several of the district meetings of the Colleges and Boards of Pharmacy are scheduled as follows: No. 5 at Des Moines, April 5th–8th; No. 6 at New Orleans, March 7th–10th; No. 4 at Chicago, May 5th–6th.

The N. A. R. D. will meet in Chicago, October 10th–14th, 1938.

Ferris Institute has appropriated $3000 for its Library.

John F. Walsh was recently elected to succeed Charles W. King as Secretary of the Massachusetts Board.

Charles W. King has been re-appointed on the Massachusetts Board of Pharmacy by Governor Hurley.

A. L. Rivard, of Lewistown, has been appointed to succeed himself as a member of the Maine Board. He has been elected *President* of the Board; Leon H. Marr is the *Secretary*.

R. M. Mitchell, of Griffin, has been elected *President* of the Georgia Board, to succeed W.

C. Bridges, and Walter West, of Sandersville was chosen *Vice-President*.

MID-WINTER MEETING OF NEW JERSEY PHARMACEUTICAL ASSOCIATION.

The mid-winter meeting of New Jersey Pharmaceutical Association was held January 26th at Swiss Chalet, near Hackensack. An interesting Business Program was carried out, supplemented by papers, reports and addresses. President Granito was honored and the guest speaker was Hon. A. Harry Moore, Governor of New Jersey.

D. C. PHARMACEUTICAL ASSOCIATION.

District of Columbia druggists are seeking fair trade legislation to be based on acts of other states. Publicity is brought to the public through the press. The Association had its beginning in 1852 and was incorporated in 1878.

ENDOWMENT FUND FOR COLUMBIA COLLEGE OF PHARMACY.

At the December meeting of the Board of Trustees of the College of Pharmacy of Columbia University, plans for securing an endowment were formulated and active work on this project will begin shortly. The Endowment Committee is headed by Dr. Edward Plaut, chairman of the Board, with Mr. A. J. Bauer and Mr. Henry Brenwasser as vice-chairmen, together with the following officers and trustees: Dr. H. C. Lovis, S. Barksdale Penick, Charles W. Holton, Samuel W. Fraser, August W. Wasserscheid and William S. Gordon.

TEMPLE UNIVERSITY NURSING COLLEGE.

Establishment of a new College of Nursing was announced January 22nd, by the administration of Temple University. Miss Beatrice Ritter, recently director of nurses at Hahnemann Hospital, has been chosen as head of the school, which will begin functioning with the reopening of the second semester on Feb. 9th.

The school will conduct a five-year program for student nurses. After two years of study in Teachers College the student will devote three years to prescribed clinical and professional work in the Medical School and hospital of the university.

Due to conflicting conventions, it has been necessary to shift the Texas Pharmaceutical Association meeting to June 20th–23rd.

PHILADELPHIA DRUG EXCHANGE ELECTS OFFICERS.

The Philadelphia Drug Exchange elected the following officers: *President*, Frank F. Law; *Vice-President*, E. L. Brendlinger; *Secretary*, J. Mervin Rosenberger; and *Treasurer*, Harold C. Halberstadt. *Board of Directors:* R. G. Anderson, George F. Aplin, J. Mahlon Buck, Harry Z. Krupp, Walter P. Miller, Jr., Paul S. Pittenger, Charles E. Vanderkleed, H. H. Whyte and E. S. Paisley.

IVOR GRIFFITH ELECTED DEAN.

The Officers of the Philadelphia College of Pharmacy and Science have announced the election of Dr. Ivor Griffith as Dean, succeeding the late Charles H. LaWall. In 1921, he was honored with the degree of Master of Pharmacy by his Alma Mater as a result of his original researches in serology.

DEAN IVOR GRIFFITH.

Prior to his election, he held the position of Assistant Dean of Pharmacy and Professor of Theory and Practice of Pharmacy and is editor of the *American Journal of Pharmacy*.

The new dean was born in North Wales, Great Britain, and came with his parents to Bangor, Pa., where his early education was obtained; in 1910, he entered Philadelphia College of Pharmacy and was graduated in 1912 with the degree, Doctor of Pharmacy.

In 1913 he became assistant in the private laboratory of Charles H. LaWall. In 1916, he was made instructor in pharmaceutical arithmetic at the College and a year later succeeded Professor LaWall as instructor in pharmacy.

Dr. Griffith is one of the contributors to the "Popular Science Talks" of his Alma Mater. In 1934, he was awarded the honorary degree of Doctor of Science from Bucknell University, and since 1926 has been active as a lecturer on Organic Chemistry at the Wagner Institute of Science.

He was the first editor of the Recipe Book, a former secretary and president of Philadelphia Branch, A. PH. A. These are part of the activities of the new dean of the Philadelphia College of Pharmacy and Science.

HONORING DEAN WULLING.

A testimonial banquet honoring Dean Emeritus Frederick J. Wulling, of the College of Pharmacy, University of Minnesota, was given Tuesday, January 18th, at the Leamington Hotel, Minneapolis, by the Theta Chapter of Phi Delta Chi Fraternity. Extending greetings to the former dean were: J. Earle Galloway, Des Moines College of Pharmacy, past grand president of the fraternity; Irving H. Robitshek, also a past grand president; John W. Dargavel, executive secretary of the National Association of Retail Druggists, and Charles H. Rogers, present dean of the College of Pharmacy, University of Minnesota. Frank W. Moudry, St. Paul druggist, acted as toastmaster.—*Northwestern Druggist.*

VIRGINIA PHARMACEUTICAL SYMPOSIUM.

The Medical College of Virginia, Richmond, Virginia, will present a Pharmaceutical Symposium of the Centennial Clebration, Thursday, February 17th, in the Richmond Academy of Medicine Auditorium. The announcement is signed by President W. T. Sanger, Dean W. F. Rudd and the chairman of the Program Committee, T. D. Rowe.

The Program announced is as follows: "The Pharmacist and Public Health," Dr. L. C. Riggin, State Health Commissioner of Virginia; "The Practice of Professional Pharmacy," Mr. Eldon Roberts, Jr., Retail Pharmacist; "The Pharmacist and the Physician," Dr. J. Leon Lascoff, president-elect of the AMERICAN PHARMACEUTICAL ASSOCIATION.

APPRECIATION DINNER.

At the dinner in Baltimore, February 3rd, Maryland expressed its gratitude to Senator Tydings for his brilliantly successful sponsorship and handling of the Tydings-Miller Enabling Act, which made the fair trade laws effective in 42 states.

All types of retail merchants in the state participated in the dinner and united to show their appreciation of the work which Senator Tydings did in placing his law on the statute books of the nation. Joining with Maryland in the dinner were representatives from the District of Columbia, Delaware and other states.

The appreciation dinner, to make the voice of his home state articulate in its gratitude for his help, was initiated by the pharmacists of Maryland under the leadership of President T. Ellsworth Ragland of the Baltimore Retail Druggists' Association.

Seated with Senator Tydings at the speakers' table was Senator John E. Miller of Arkansas, successor to the late Senator Joe Robinson, democratic leader of the Senate. While a member of the House of Representatives, Senator Miller, an ardent friend of fair trade, managed the Tydings Act through that legislative body with great skill.—Through *Drug Topics.*

CHICAGO BRANCH A. PH. A.

The Chicago Branch will celebrate its 250th meeting by a dinner meeting at one of the down-town hotels. Dr. Ernest Little, chairman of the Committee on Local and Student Branches, will be the speaker. President Gathercoal, of the A. PH. A., and President-Elect J. Leon Lascoff, Secretary E. F. Kelly and other members of the official family have promised to be present at this gala occasion. Members of the parent Association residing in the surrounding states will be invited to join the Chicago members in celebrating the affair.

The American Drug Manufacturers' Association will meet in White Sulphur Springs, W. Va., May 2nd to 5th, inclusive; Headquarters, The Greenbrier.

AMERICAN CHEMICAL SOCIETY.

The American Chemical Society has been organized under Federal Incorporation Act. Under the law the 1937 Board of Directors became the individual required to incorporate

anew the American Chemical Society and to adopt a Constitution and By-laws and regulations to carry out their request as outlined in the Act. A complete report is published in the *News Edition* of January 20th.

The annual meeting of the American Chemical Society will be held in Dallas, April 18th to 22nd.

The November issue of the *New Jersey Journal of Pharmacy* carries the Proceedings of the sixty-seventh annual meeting, held at Atlantic City in 1937. President Charles R. Garrabrant graces the front page; Prescott R. Loveland is the Managing Editor and Robert P. Fischelis, the Editor.

The December number reprints a very favorable comment on its work and service.

Dr. Wesley Clair Mitchell, of the University of Chicago, is President-Elect of the American Association for the Advancement of Science. The report appears in the issue of February 4, 1938, of Science, edited by **F. R. Moulton,** Permanent Secretary.

Charles O. Wilson has been appointed Assistant Professor of Pharmaceutical Chemistry, George Washington University School of Pharmacy, Washington, D. C. He received his degrees—Ph.C., M.S., from the University of Washington and is a Registered Pharmacist of the State of Washington.

Dr. Walter A. Bastedo was guest speaker, Columbia University, College of Pharmacy, January 18th. Dr. Bastedo is an alumnus of this institution, class of '94 and president of the U. S. Pharmacopœial Convention.

ARIZONA UNFAIR SALES AND PRACTICES ACT CONSTITUTIONAL.

Judge Richard Lamson, of Yavapai County, handed down a decision on the A. J. Bayless case in which he held constitutional and valid the state's Unfair Sales and Practices Act.

In reply to the defense contention that the law violates the constitutional provision Article XIV, Section XV, which prevents creation of trusts and monopolies and restraint of trade, his opinion was as follows:

That this act intended to protect the public welfare by eliminating unfair trade practices and unfair competition in wholesale and retail trade and in no way tends to create a monopoly in any line of commerce.

The temporary restraining order against Bayless was absolved on account of insufficient evidence. There will be no appeal made in this case.

ARIZONA SULFANILAMIDE LAW.

The Board of Pharmacy in explanation of the following regulation states that in cases of refills of prescriptions of sulfanilamide the doctor should always be contacted for permission to refill. This precaution is a protection for the druggist as well as the patient. Copy of regulation follows:

"The Chemical compound known and designated as sulfanilamide, or any preparation containing same, shall not be sold, dispensed or otherwise distributed at any pharmacy, drug store, pharmacy department, prescription laboratory, dispensary, apothecary or any other place of business in which drugs, medicinal chemicals, medicines, poisons, proprietary or patent medicines are sold in the State of Arizona, except on prescriptions of licensed physicians; and, provided further, that this regulation shall not apply to wholesale distributors of such medicinal compound.

"Any person violating any of the provisions of this regulation shall be prosecuted, as provided by law, and the permit or license of any pharmacy, drug store, pharmacy department, prescription laboratory, dispensary, apothecary or any other place of business in which drugs, medicinal chemicals, medicines, poisons, proprietary or patent medicines are sold, except on prescriptions of licensed physicians, violating the provisions of this regulation shall be subject to revocation under the provisions of Paragraph 25389, Revised Code of Supplement Arizona 1936."—From Bulletin, *Arizona Pharmaceutical Association*.

GEORGIA DRUG LAW.

Section 1. That (*a*) in order to safeguard the public health against the distribution of drugs which have not become generally recognized as safe for use, no person shall manufacture or compound in this state or introduce or deliver for introduction into this state any drug composed in whole or in part, of any substance or combination of substances, which substance or combination if not generally recognized as safe for use in the dosage and with the frequency and duration prescribed, recommended or suggested in the labeling thereof, unless the packer of such drug holds a joint notice of a finding by the State Chemist and the Director of the State Department of Public Health that such drug is not unsafe for use.

REPRINTS RECEIVED.

We have been favored by Dr. John C. Krantz, Jr., Baltimore, and co-workers, with reprints as follows: "The Fermentation of Propylene Glycol by members of the Escherichia-Aerobacterin Intermediate Groups." By K. Pierre Dozois, Gregory A. Lee, C. Jelleff Carr, Frank Hachtel and John C. Krantz, Jr., Departments of Bacteriology and Pharmacology, School of Medicine, University of Maryland and Bureau of Laboratories of the Baltimore City Health Department. (Reprinted from the *Journal of Bacteriology*, Vol. 34, No. 1, July 1937.)

"Sugar Alcohols IX.—A Physicochemical Study of the Erythritan-Boric Acid Complex." By John C. Krantz, Jr., Frances F. Beck and C. Jelleff Carr. (Miss Beck is an Emerson Fellow in Pharmacology.)—Department of Pharmacology, School of Medicine, University of Maryland, Baltimore, Md.

"The Metabolism of Adrenalectomized Rats," C. Jelleff Carr and Frances F. Beck.—Reprinted from *The American Journal of Physiology*, July 1937.

"Glycolysis and Tumor Growth," John C. Krantz, Jr., Ruth Musser, C. Jelleff Carr and Wm. G. Harne.—Reprinted from the *American Journal of Cancer*, June 1937.

Contributions to the Morphology of *Datura Stramonium* L.—An Inaugural Dissertation for attaining the Ph.D. degree by Wilhelm Fischer, Apotheker in Basel. The studies and work were carried on under Dr. H. Zörnig and Dr. G. Senn. The text is presented in 68 pages and 4 pages of illustrations, including 31 half-tones.

FOURTH ANNUAL SURVEY OF RESEARCH IN PHARMACY.

Editor John C. Krantz, Jr., presents the following *Preface* of the *Annual Research:* "One of the functions of the National Conference on Pharmaceutical Research is to aid in coördinating the research activities of its members and encourage pharmaceutical research in its broadest sense. Pursuant to this end, last year, the Conference published its third *Annual Survey of Research in Pharmacy*. The publication was received again with enthusiasm and interest by research workers and educators in the pharmaceutical sciences. The work, therefore, has been continued. It is the wish of the Executive Committee that this fourth *Annual Survey of Research in Pharmacy* will serve the research workers in the pharmaceutical sciences by correlating, summarizing and evaluating the increment of progress of the year July 1936–June 1937."

BOOK NOTICES AND REVIEWS.

Die Pflanzenstoffe. Supplement to Second Edition. By ROLAND E. KREMERS. To all workers in pharmaceutical science who are acquainted with Professor Carl Wehmer's classical compilation, "Die Pflanzenstoffe" no additional comment on the appearance of the supplement to the second edition is needed. This volume of 244 pages covers the literature for the years 1930 to 1934, inclusive, and will surely be wanted by all who possess a copy of the second edition. Like the small supplements included in the previous editions, the arrangement is alphabetical.

In the forword to this publication Professor Wehmer's son states that the successful compilation of the manuscript was the last objective of Professor Wehmer's lifelong interest in this subject. It will be a source of gratification to all users, just as it was to the author himself, that the work was completed in spite of illness. Also it is a fitting tribute to the author that the frontispiece in the supplement is a reproduction of a photographic portrait.

Perhaps the most significant statement in the forword is the closing paragraph. In this Dr. C. Wehmer, Jr., expresses the hope that some one will take up the work of continuing the review and compilation of literature on plant substances which his father has relinquished in death. Surely this is a challenge. It will be interesting to await the unfolding of time and to learn in the course of events whether the continuation of this contribution to science will be undertaken by some German disciple of Professor Wehmer or whether American phytochemistry will have the energy and maturity to transplant this work to a new country.

Book Notices which have been held back on account of large issues of the JOURNAL will be taken up with the February issue.

THE PROCEEDINGS NUMBER.

The Proceedings Number of the JOURNAL—described on page 1265, December number—may still be obtained at $1.00 per copy. It will be of value on account of the information contained; libraries and individuals should order promptly.